THE AMERICAN REVIEW OF TUBERCULOSIS

OFFICIAL JOURNAL OF THE AMERICAN TRUDEAU SOCIETY

ABSTRACTS OF TUBERCULOSIS

EDITOR

MAX PINNER, New York City

EDITOR EMERITUS

ALLEN K. KRAUSE, Baltimore, Maryland

EDITORIAL BOARD

JOHN ALEXANDER, Ann Arbor, Mich.
J. BURNS AMBERSON, JR., New York City
E. R. BALDWIN, Saranac Lake, N. Y.
H. J. CORPER, Denver, Col.
F. S. DOLLEY, Los Angeles, Calif.
BRUCE H. DOUGLAS, Detroit, Mich.
L. U. GARDNER, Saranac Lake, N. Y.
ROSS GOLDEN, New York City
ESMOND R. LONG, Philadelphia, Pa.
L. J. MOORMAN, Oklahoma City
D. W. RICHARDS, JR., New York City

VOLUME XLI

JANUARY-JUNE, 1940

PUBLISHED MONTHLY

AT MT. ROYAL AND GUILFORD AVENUES, BALTIMORE, MD.

BY THE NATIONAL TUBERCULOSIS ASSOCIATION

THE

AMERICAN REVIEW OF TUBERCULOSIS
ABSTRACTS OF TUBERCULOSIS

VOLUME XLI MARCH, 1940 ABST. No. 1

CONTENTS

	Pages
Statistics, Epidemiology, Prevention	1–13
Tuberculosis in Infancy and Childhood	13–18
Tuberculosis of Lungs	18–27
Tuberculosis of Other Organs than Lungs	27–28

Statistics of Tuberculosis.—The authors describe a modification of the conventional life table, designed for the study of mortality and of results of treatment in tuberculosis. The "probability of death" within a year is the ratio of known deaths to the number under observation at the beginning of the year, after correcting the latter figure by deducting one-half the number whose whereabouts at the end of the year was unknown. By calculating in this manner the percentage surviving each year, the percentage of those originally at risk who survived "n" years can be determined. This method can also be applied to study of the percentages of patients who improve, grow worse or are unchanged. Since not every patient is examined each year, and changes other than death can be found only by examination, it is necessary to distinguish between the number of "survivors" and the number "examined." The percentages who improved, grew worse or were unchanged are based on the survivors of a given year (obtained from the mortality computations) who were examined. The method is illustrated by analysis of a group of patients with moderately advanced tuberculosis observed for four years after diagnosis. The cumulative mortality was 14.5 per cent in the first year, 19.7 per cent in the second year, 32.5 per cent in the third year, and 40.9 per cent in the fourth year. Analysis of the survivors showed that by the end of the period of observation 22.5 per cent had improved, 25.1 per cent had grown worse, and 11.5 per cent had shown no change in status. A suitable method for graphic presentation of these results is also illustrated.—*Analysis of the Subsequent Course of Diagnosed Cases of Tuberculosis, Ruth R. Puffer, H. C. Stewart, P. H. Gass & R. S. Gass, Am. J. Pub. Health, August, 1939, xxix, 894.*—(*H. L. I.*)

Tuberculosis in Industry.—There are many factors that influence the mortality from tuberculosis. In general there is greater mortality in males than in females in the United States. Before the age of ten more boys than girls die of tuberculosis; from ten to thirty years of age the opposite prevails; and after the age of thirty the death rate among males is again greater. When analyzing the death rate in industry it is important to find the various age groups and compare the death rate with the usual death rate at that age. Racial groups in whom the death rate may be four or five times greater than that of the white race will profoundly influence the incidence of tuberculosis in any industry in which they are employed. Whitney found that among unskilled workers the death rate from tuberculosis is more than twice what it is among skilled workers. The incidence of tuberculosis in any particular industry is greatly influenced by the sources from which workers in that industry have been recruited. Tuberculosis may be discussed as an occupational disease when it develops in workers caring for the tuberculous; or in those who are in contact with a large number of persons in whom tuberculosis may exist; or in

those workers who are continuously exposed to silica dust. There is no definite proof that silicosis in humans increases susceptibility to tuberculosis. Nor is there definite proof that there is a higher death rate from tuberculosis in silicotics than in nonsilicotics. Whereas trauma cannot produce tuberculosis, it can reactivate a dormant focus of infection or accelerate the progression of a previously active lesion. All traumatic lesions should be studied by roentgenograms immediately and at the end of the first or second week. If no changes have been noted in this interval, it is logical to assume that the trauma has no causal connection with tuberculosis that may develop at a later date. Noxious gases and vapors may also activate preëxistent pulmonary tuberculosis; the time interval between the trauma and activation is generally from twenty-four to forty-eight hours. A few of the industrial poisons capable of severely irritating the bronchopulmonary system are ammonia, benzine, chlorine, hydrogen sulphide, nitric acid fumes, phosgene, sulphur dioxide, selenium and vanadium. Trauma plays an important part in extrapulmonary tuberculosis. Here the time interval is of less importance because of the difficulty encountered in diagnosing early tuberculosis in the genitourinary tract, bones, brain and elsewhere than in the lungs.—*Tuberculosis in Industry, G. G. Ornstein & D. Ulmar, Quart. Bull. Sea View Hosp., January, 1939, iv, 164.*—(*A. A. E.*)

Tuberculosis Mortality in Italy.—International statistics show that there are more deaths from tuberculosis, in all forms, in rural countries than in industrial countries, except in Italy where mortality from tuberculosis is lower in rural than in industrial sections. A study is made of tuberculosis death rates in Italy from 1924 to 1937: from a peak of 151.8 per 100,000 in 1924 there was a steady decrease during the next thirteen years to 86.5 in 1937. This decrease was noted in all Departments of the country. But while the total number of deaths in 1937 continued to be higher in the industrial Departments, the greatest proportional actual decrease of deaths occurred also in the industrial Departments. The author attributes this proportional decrease of mortality in the industrial districts to less illiteracy and to larger income and personal wealth with consequently better economic, hygienic and social conditions.—*La diminuzione della mortalita per tuberculosi in Italia dal 1924 al 1937, in relazione con alcuni fattori ambientali e sociali, A. Tizzano, Riv. di pat. e clin. d. tuberc., November, 1938, xii, 823.*—(*S. L.*)

Social Aspects.—Tuberculosis is a social disease because it is more prevalent wherever adverse living conditions exist, and because it occurs frequently during the best productive years of its victim. It is a disabling and pauperizing disease which changes the economic status of so many families that it must be considered an important factor in the national economy. An effective campaign against this disease must take into consideration both medical and economic aspects. Early international statistics, after Koch's discovery, showed that economic conditions played a small part in the United States, in comparison to many European countries. This was a result of the extremely favorable living conditions and the higher standard of living in the United States. Intensive medical efforts, starting in 1904, led to important victories, even though the drive on the social front was lagging behind. There was a steady decline in tuberculosis mortality, continuing into the present decade; the economic depression appeared to have no effect. However, in 1935, the tuberculosis death rate was only 2.8 per cent lower than in 1934, whereas the drop had been 4.9 per cent during the previous year. In 1936, the death rate was 55.4 (per 100,000) as compared to 54.5 in 1935. For the first time in decades, there had been an increase in death rate. Since there had been no let-up in the antituberculosis campaign on the medical side, this increase must be interpreted as the effect of the change in economic conditions which has slowly taken place during eight depression years. Adverse living conditions influence the development of tuberculosis either by their effect on resistance, or by increased exposure. During the World War, in spite of the splendid development of medical machinery to combat tuberculosis, in such countries as England and Germany, there was a constant increase in the specific death rate both at the front and in the rear. The changed environment, particularly with regard to food supply and general living conditions, apparently had a profound and almost direct effect on the tuberculosis death rate. The death rate rose most rapidly during the later period when it became necessary to draft the less fit for military or industrial service. This group found it more difficult to adapt itself to increased hardships and many an "unknown" consumptive died from changed environment. The death rate, highest among the Central Powers, dropped rapidly after the Armistice, in proportion to the supply of food which became available. The observations collected the world over between 1914 and 1922 justify the conclusion that the environment is

the determining epidemiological factor in tuberculosis, whereas prevention of infection plays a secondary rôle. During periods of economic depression, those who are less fit for hard work cannot compete in the struggle for employment and are laid off first. This group is, therefore, forced into a period of rest which, particularly in the case of the chronic consumptive, is actually beneficial. If the minimum food requirements are met, the weak and less resistant are better off by being forced to be idle. During the present depression, as far as tuberculosis is concerned, the deleterious effect of poor nutrition was apparently counterbalanced by the protective influence of increased rest. However, from the general health standpoint, this demobilization of the physically weak cannot be expected to overcome the chronic drain of a prolonged period of depression. During the course of years these adverse conditions, with particular regard to food, clothing and housing, will inevitably affect the health of the nation. This is shown by various statistical studies such as those contained in the bulletins issued by the National Institute of the United States Public Health Service. The incidence of disability is 100 per cent higher in the low income than in the higher income groups. Chronic disabling illness in the relief population occurred at an annual rate 87 per cent higher than among families in the highest income class. The annual days of disability per capita in the relief group were found to be three times as great as among the higher income groups. All available data would seem to point to the conclusion that the vitality of the American people showed an impairment and that particularly the low income classes began to feel the effects of the depression in 1935. In its general effect on health a prolonged depression differs from war in degree more than in principle. There is more time for adjustment during an economic crisis, but the ultimate effects may be disastrous. Tuberculosis is so intimately bound up with universal economic factors that reduction and final conquest will depend largely on the restoration of normal economic conditions.—*The Social Aspects of Tuberculosis, K. Fischel, Bull. de l'Union Internat. contre la tuberc., January, 1939, xvi, 6.*—(*H. R. N.*)

Tuberculosis and Nutrition.—During the first years of the war, especially in 1916–1917, the mortality from tuberculosis in Denmark rose about 30 per cent. It again declined in 1918. During these early years there was a greatly reduced consumption of various foodstuffs, principally veal, beef, fish and butter, and probably also milk, due to heavy exports and the high cost of living. After the commencement of the blockade in 1917, the previous shortage of foodstuffs was replaced by a high consumption of meat and fish, as well as bread and sugar in the entire urban population, by means of rationing and public grants to insure equal distribution. Margarine was replaced by butter, although the total quantity of fat was reduced to about half. The rise of mortality from tuberculosis would seem to be ascribable mainly to a shortage of meat and fish rather than to a lack of A-vitamins. This increased mortality, which was probably a result of shortage of foodstuffs, was most pronounced during the ages fifteen to twenty-five, whereas in former times, where there was great risk of superinfection, the mortality in urban populations increased with age.—*Tuberculosis and Nutrition, K. Faber, Acta tuberc. Scandinav., 1938, Fasc. 4, xii, 287.*—(*F. B. S.*)

Tuberculosis Epidemic on a Swedish Island.—Among 750 inhabitants there occurred 6 cases of erythema nodosum during November and December in young people between sixteen and twenty-three years of age. At the end of December an acute infectious case of pulmonary tuberculosis occurred in a person who had been in contact with the above mentioned people and in the spring 9 cases with exudative pleuritis developed in known contacts. Further cases occurred also, and it appeared that cases of exudative pleuritis usually appeared three to six months following outbreaks of erythema nodosum. Among 50 infections which occurred, 8 per cent were erythema nodosum and 20 per cent were exudative pleuritis.—*Untersuchungen über eine Tuberkuloseepidemie auf einer Insel in den Schären der Schwedischen Westküste, G. Vieweg, Acta tuberc. Scandinav., 1938, Fasc. 4, xii, 345.*—(*F. B. S.*)

Mortality of Pulmonary Tuberculosis in Norway.—This is a report upon the experience of 8,364 patients reported to the Board of Health of Oslo from 1911–1930 and of 1,546 patients treated at Vardåsen Sanatorium from 1923–1934. The period of observation of the patients varied from one to twenty years.—*Mortality Observed among Cases of Pulmonary Tuberculosis, Julie E. Backer, Acta tuberc. Scandinav., Fasc. 1–2, 1939, xiii, 1.*—(*F. B. S.*)

Milk-borne Tuberculosis.—An account is given of an epidemic of tuberculous infection which took place in Horred, Sweden in the autumn of 1936. Several children fell ill with fever and cervical adenitis, and all

of them had consumed milk from a single dairy. Further investigation revealed a total of 56 persons in whom there was strong presumptive evidence of a fresh tuberculous infection, 24 of these having displayed negative reactions to tuberculin a short time before. Forty-seven of these individuals were children under twelve, the remaining 9 were adults. On tuberculin-testing the children of Horred, it was found that among 113 children not using milk from the dairy in question only 8 reacted to tuberculin, and in 6 of these either known earlier infection or familial association with tuberculosis explained their reactions. In contrast to this group, among 50 children giving a history of consuming the suspected milk, 45 were tuberculin-positive and for only 2 was some other source of infection considered at all likely. The dairy was found to contain a cow suffering from tuberculosis of the udder; and tubercle bacilli were demonstrated in her milk by direct smear. Of the 56 presumably fresh infections, 30 presented symptoms of illness. Fever was common. Cervical adenitis with a rather acute onset was observed in 17 persons. There were 4 instances of tuberculosis of the mesenteric lymph nodes, 2 occurring in combination with cervical adenitis. There were 5 instances of supposed tuberculosis of the tracheobronchial lymph nodes, one occurring in combination with cervical adenitis. Erythema nodosum occurred alone in 3 cases and with other conditions in 2 cases. Phlyctenular conjunctivitis was encountered in 4 individuals, but in only 2 of these was it the only manifestation. A few of the more severe cases are reported. In one instance the milk had been in use only two weeks and a child known to be tuberculin-negative prior to its use became ill with cervical adenitis and fever and showed a positive tuberculin about forty days after consumption had begun. Bovine tubercle bacilli were isolated from the stomach-washings of one of three children subjected to this procedure. The epidemic is reported two years after its occurrence and to date there have been no instances of bone tuberculosis, pulmonary involvement or tuberculous meningitis.—*A Tuberculosis Epidemic Caused by Milk-borne Infection, S. Stahl, Brit. J. Child. Dis., April–June, 1939, xxxvi, 83.*—(*M. B.*)

Tuberculosis in Finland.—Tuberculin tests performed on 56,417 recruits from 1929 to 1933 showed a spread of tuberculosis in Finland. Pirquet tests with OT were used throughout, and when negative or doubtful, Mantoux tests with 0.1 mg. tuberculin were performed; 93.2 per cent of the urban and 87.5 per cent of the rural recruits, or 88.4 per cent of the total number of recruits, had positive reactions. Further analysis reveals that the incidence of tuberculous infection in recruits from West Finland corresponds to the tuberculosis mortality found in the 1921 to 1930 survey, while tuberculous infection was greater in the East Finland recruits than anticipated from the earlier mortality statistics. The spread of tuberculosis in East Finland is attributed to the recent industrialization of that district.—*Über die Verbreitung der Tuberkuloseinfektion in ganz Finnland, S. Savonem, Ztschr. f. Tuberk., December, 1938, lxxxi, 219.*—(*A. B. C.*)

Tuberculosis in Tanganyika.—This paper deals chiefly with the so-called Moshi District in the Northern Province of Tanganyika, formerly German East Africa. The hot, dusty little town of Moshi lies on the plain below Kilimanjaro, at an altitude of 2,600 feet, most of the population occupying the fertile lower slopes of the mountain at between 3,500 and 6,500 feet altitude. The ground is fertile and populous above the level of the tropical rain forest. The population is about 172,000 with average density 77.4 per square mile but over 400 on the mountain slopes. The natives, of the Chagga tribe, live in beehive huts of banana thatching over a pole framework with one door and no windows. At lower levels grass thatches are used. These huts are crowded and unbearably hot and stuffy. MacNaughton in 1926 reported a considerable prevalence of tuberculosis and a small sanatorium was established. From here visits were made to villages and subdistricts, beginning in 1927, but X-ray and pneumothorax facilities were not available and most pulmonary cases brought in died within a few months. Tuberculin therapy was tried with some alarming results. Families and contacts of known sputum-positive cases were tested and examined. In one village, of 1,108 family contacts of 81 sputum-positive cases, 82 additional cases were discovered and 22 per cent of 680 positive reactors (61.4 per cent of contacts reacting) developed the disease during observation. However, early lymphatic and pulmonary cases were found to do well on general medical treatment and additional beds and staff (chiefly native) were added. At the end of 1936, there were 2,122 recorded cases of tuberculosis, 1,441 of them pulmonary and 940 known sputum-positive, and the figures are now nearer 3,000. Of 576 known deaths among these cases, 538 were among the pulmonary. In 1932 Davies brought back with him both a pneumothorax apparatus and instruments for thoracic surgery

and an X-ray apparatus was donated, portable in type. Other procedures than pneumothorax could only very gradually be introduced. Over a period January, 1933 to December, 1937, collapse therapy was used on 261 patients, 219 of these pneumothorax, with or without supplementary measures. The results in 238 patients traced up to December 31, 1937 (51 minimal and moderate and 187 far advanced) showed 60 per cent living and 40 per cent dead. Of the living, 67 per cent were working. Of the minimal and moderate cases, 92 per cent were living and 83 per cent of these working. Of the advanced group, 51 per cent were living and 58 per cent of these working. For those cases begun in 1933, nearly 50 per cent were living the fifth year. During the last two years a village settlement has been established near the hospital and handicrafts are encouraged. There is also close medical supervision.—*The Work of a Tuberculosis Unit in East Africa, H. N. Davies, Tubercle, November, 1938, xx, 76.*—(*A. P.*)

Tuberculosis in British Guiana.—This South American country was originally the home of various aboriginal Indian tribes and in early colonial days was the scene of almost continuous warfare between English, French and Dutch traders and settlers. Real colonization, followed by importation of African slaves, began about 1740 and continued until the slave trade was abolished in 1807, meanwhile this forced immigration reaching 5,000 per annum. Later the freed slaves formed companies and bought up abandoned plantations from which arose coastal villages, the drift being constantly toward the towns. To replace this African slave industry there arrived in the nineteenth century many immigrants, especially Portuguese, East Indian and Chinese. Since 1861 a decennial census has been kept except for 1911. In 1934 the population of the country was estimated at 323,171, of which Georgetown, the capital, held 63,080. The Negroes and East Indians each comprise about 120,000. The British make up a small minority, after mixed, aboriginal Indians, Portuguese and Chinese. The sugar industry is the principal one, followed by the growing of rice and other products. There is some alluvial gold mining but no large industrial concerns. The climate, although tropical, is not excessively hot or uncomfortable. The Demerara River divides the two most populous counties, the other two, Berbice and Essequibo, being inhabited chiefly by East Indians. In 1907 there was founded the British Guiana Society for Prevention and Treatment of Tuberculosis and a dispensary was opened in Georgetown for the diagnosis and treatment of tuberculosis, voluntarily staffed. In 1911 a Health Visitor was appointed and 118 patients registered, of whom 98 gave a history of contact. In the year 1912 the dispensary had 1,227 persons visit it for advice and examination, a figure not exceeded for another twenty years. In 1913 was erected the King Edward VII Memorial Tuberculosis Dispensary, the building and equipment being met by subscriptions from within the Colony together with a Government donation. Compulsory notification was also enacted as a public health measure. By 1917 there were 4 Health Visitors the last 2 being of African descent and recruited from the teaching profession and being trained at the Public Hospital and Royal Sanitary Institute and in 1918 a branch dispensary was set up in the county of Berbice and a fifth Health Visitor added. Branch dispensaries also were established in East and West Demerara under District Government Medical Officers. During 1914–1918 the tuberculosis death rate continued to fall, reversing the trend in Europe. This was an era of prosperity associated with active demand for sugar. In 1921 a tuberculosis hospital was opened at Best on the opposite bank of the Demerara from Georgetown, accessible by ferry, with 20 male and 20 female beds. By 1925 there were 6 dispensaries in existence and in 1932 continuity of service by specially trained physicians came into existence and the work was reorganized. Follow-up and contact examinations were now instituted and in 1933 collaboration with the X-ray department of the Georgetown Public Hospital was established and collapse therapy instituted. In the middle of 1934 fluoroscopic examination was instituted. Cochrane, after an experience with some 1,200 fluoroscopic examinations, has had but one case passed as negative returned later as tuberculous, this after a nine months' interval. Both the crude and the tuberculosis mortality have been falling since about 1893, the latter more markedly (from 319 to 90 per 100,000 for 1929–1933). It appears, however, that the earlier period, following the freeing of slaves and migration to larger communities, resulted in a marked increase in tuberculosis morbidity and mortality between 1847 and 1900. Grieve, in 1890, pointed out the frequency of rapidly progressive caseous pneumonia in British Guiana Negroes whereas East Indians had the fibroid form of phthisis. At present the aboriginal Indians suffer most heavily, 1.9 per 1,000, Negroes 1.3 per 1,000, Portuguese 1.2 per 1,000, East Indians and Chinese 0.8 per 1,000. Negro women have a higher rate

than men, while the reverse is true for East Indians.—*Tuberculosis in British Guiana, E. Cochrane, Tubercle, June, 1938, xix, 403.*—(*A. P.*)

Tuberculosis in British Guiana.—Continuing his previous investigations, Cochrane attended during 1933 and 1934 a total of 538 necropsies at the Public Hospital at Georgetown and of these he performed a considerable number. Detailed dissections were not practicable and the notes were chiefly confined to the types of thoracic and abdominal lesions present. Of the 538, 98 showed evidence of tuberculosis, the more acute forms and childhood types being found predominant in those of African descent. Among children, mostly Negroes, no more lesions were found than in Great Britain, indicating that primary infections were no more dangerous. There were 40 cases among Negroes, and in nearly all of these it was the primary cause of death. There were 21 cases in East Indians (adults) and in 15 it was the cause of death. Those with evidence of old lesions were all over forty. It was found in 12 adults of mixed race and in 11 was the cause of death. Only a few Portuguese and aboriginal Indians were included. In 103 necropsies of children between seven weeks and thirteen years, tuberculous lesions were present in 17, in 14 being the cause of death. Of the total, 66 were Negroes, 21 East Indians and 16 mixed. Of the total series 16.5 per cent showed tuberculous lesions, fatal in 87.5 per cent, figures closely approximating those of Blacklock in Great Britain. Five children, all Negroes from Georgetown, succumbed to abdominal tuberculosis. Cow's milk is not consumed, hence the mode of access must have been due to infected food. The notes of some 200 cases on the register of the Georgetown dispensary were analyzed. Of these, 116 were Negroes, 66 females and 50 males. Above 30 per cent had a definite history of contact with an open case, higher in females. A practically universal symptom was cough, with fever and loss of weight next in frequency. Of the males, 24 per cent, and of females, 16.6 per cent gave a history of haemoptysis. Clinical findings were about the same as in Europeans except that skin changes were more marked. The X-ray films usually showed massive mottling, most marked in the upper lobes. In 10 there was a miliary dissemination. Among complications, laryngitis and enteritis were common, meningitis apparently rare. The average duration of life from the onset of symptoms was ten months. The cases among the mixed population differed very little except that haemoptysis seemed more uncommon among males. Fibrosis also was more in evidence than among Negroes. The males also showed more of light color, suggesting predominant European blood. In East Indians, the disease was slightly less acute than among Negroes. Little information was obtainable about the Portuguese. Between May, 1933 and July, 1935 all open cases were treated by collapse therapy, 31 by pneumothorax, 8 by phrenic evulsion and 3 by both methods. No untoward complications occurred but in 5 others there were adhesions preventing collapse and 29 per cent of the treated showed pleural exudates. In only 7 cases (22.5 per cent) was there a complete collapse. Under collapse therapy, 66.6 per cent of the patients improved, despite lack of proper accommodation, after-care and other facilities. Gold salts and sodium morrhuate were used on a small group but the Negroes seemed to be adversely affected with increasing albuminuria and no clinical benefit. This form of therapy has now been limited to Europeans and those of predominantly European blood.—*Tuberculosis in British Guiana, (continued), E. Cochrane, Tubercle, July, 1938, xix, 453.*—(*A. P.*)

Tuberculosis in British Post Office Service.—The staff consists of about 125,000 men and 37,000 women. About 25 per cent of the men are fifty years of age or over and about 23 per cent of the women forty years or over, excluding the engineering staffs. There are accurate sick records covering about 260,000 persons from sixteen to sixty and a few from fourteen up. The incidence of pulmonary tuberculosis compares favorably with that in the community at large with a steadily downward trend, being 148 per 100,000 in the years 1931–1935. There was recently published in the Lancet (1936) a review of the after-histories of 3,755 reported cases followed from ten to twenty-two years. It was found that 50 per cent of such were never able to resume work and of the others there was almost a 50 per cent wastage, from recurrence or other disability, especially during the first ten years. The light manual and clerical indoor workers had a slight advantage. Women had a slightly lower incidence than men. The highest incidence by 50 per cent, occurred in the twenty to thirty age group.—*Pulmonary Tuberculosis in Women Workers, H. H. Bashford, Brit. J. Tuberc., July, 1938, xxxii, 167.*—(*A. P.*)

New York State Tuberculosis Program.—The following procedures are considered essential measures in a tuberculosis control program: (*1*) reporting and registration of cases of tuberculosis, (*2*) finding of

active and progressive cases, (*3*) segregation and treatment of patients suffering from the disease, (*4*) domiciliary supervision of families in which tuberculosis is or has been a problem, (*5*) rehabilitation of cases, (*6*) the follow-up of all cases and contacts and (*7*) financial assistance to needy families in a manner free from the stigma of pauperism. Also important is research in epidemiology, as well as in administrative methods. This program is based on the conviction that environmental factors are more influential in the development of tuberculosis than are constitutional factors. The activities of the State Department of Health under the items enumerated above are described in considerable detail.—*Developments in the New York State Tuberculosis Program, R. E. Plunkett, Am. J. Pub. Health, September, 1939, xxix, 983.*—(*H. L. I.*)

Pennsylvania Plan for Tuberculosis.—The Pennsylvania plan for tuberculosis involves improvement in case-finding, treatment and rehabilitation programs, and the coordination of all antituberculous organizations. The latter end is furthered by the establishment of a tuberculosis committee in every county medical society, in every state medical society, and in the American Medical Association (not yet achieved). Improvement in the case-finding program depends largely upon education of the public, chiefly through the National Tuberculosis Association and its component societies; education of the medical profession in the medical school, where committees can work with the deans to improve the specialized teaching of chest diseases, in general practice, through such publications as the *American Review of Tuberculosis, Diseases of the Chest, Tuberculosis Abstracts* furnished physicians on request, and through tuberculosis programs and papers for every variety of medical meeting; education of state legislators, largely through the tuberculosis committees of each county and state medical society in their contacts with their state representatives and senators; case-finding methods, which are closely linked with proper costs, and, under the Pennsylvania plan, recognize the following principles: the maintenance of widely distributed tuberculosis clinics, properly staffed and equipped with fluoroscope and pneumothorax apparatus, and out of which operate specially trained nurses who constantly check the contacts, tuberculin testing followed by roentgenograms of reactors. The objection that the latter may interfere with the income of local specialists has not been borne out, and on the contrary has led to increased work for private roentgenologists and physicians as case-finding increases. Motorized X-ray field units are used and are extremely valuable. This work is conducted chiefly with high school age students. In 1936, of 37,485 ninth grade children examined, 11.3 per cent were reactors, and 155 had active tuberculosis. A similar program in the teachers' colleges will tend to prevent children contacts with teachers who have active tuberculosis. Under the case treatment part of the program, Pennsylvania is engaged in extensive tuberculosis sanatorium building, and the efforts of tuberculosis committees of the various medical societies are being directed toward the establishment of proper staffing, salaries, living conditions, treatment standards and job security, with abolition of patient help in institutions. Rehabilitation of patients is in the early experimental stage. To avoid much of the discouragement that at present exists with respect to rehabilitation, it should be recognized that patients should be cured before being rehabilitated, that the sanatorium is not the place for rehabilitation and that position selection should avoid undue possible menace to the public in the future.—*The Treatment of Tuberculosis under the Guidance of Organized Medicine: The Pennsylvania Plan for Tuberculosis, F. W. Burge, J. A. M. A., November 12, 1938, cxi, 1938.*—(*G. L. L.*)

Case-Finding in Detroit.—In the case-finding plan inaugurated in Detroit in 1936, the city was divided into two parts. Sections with an incidence of tuberculosis excessively high were designated the Special District. Here it was desired to examine everyone. Each house was canvassed by nurses who urged examination for each individual, and physicians were urged to give tuberculin test and X-ray examination to their entire clientele. In the rest of the city physicians were requested to give these examinations to all known contacts and to individuals suspected of having tuberculosis. The authors give a preliminary report of the results obtained during the first eighteen months. The results of 114,831 tuberculin tests (for the most part Pirquet tests) were reported by 705 individual physicians. Of these, 27.8 per cent were positive. Active pulmonary tuberculosis requiring treatment occurred in 2.3 per cent of the positive reactors. The percentage of reactors ranged from 5.9 per cent in the age group 0–9 years to 44.3 per cent in those aged thirty years and over. In each age group approximately 2 per cent of the reactors had active tuberculosis. Comparison of the results of tuberculin test and X-ray examina-

tion in inhabitants of the poor district with inhabitants of the remainder of the city gave conflicting results. The authors conclude that the studies in the two districts were not comparable.—*Results Obtained in an Extensive Tuberculosis Case Finding Program in a Large City, B. H. Douglas & G. E. Harmon, Am. J. Pub. Health, June, 1939, xxix, 583.*—(*H. L. I.*)

Tuberculosis in a Regiment.—The Pirquet test gave reactions in 80 per cent of a contingent of 936 young men entering an infantry regiment in the north of France. Men from rural areas were 58.6 per cent positive, while men from urban areas were 82.6 per cent positive. The percentage of reactors was considerably higher than that found in studies of other French military groups; it is suggested that this is a reflection of the high incidence of tuberculosis among the inhabitants of war-torn northern France. Reëxamination of the negative reactors after an interval of six months showed 36.3 per cent had become positive. Reëxamination at the end of eighteen months' service showed the development of a positive test in 39.3 per cent of those previously negative. Of the 74 men whose reaction became positive, 3 developed pleurisy and one developed pleurisy with parenchymal infiltration. Two additional men had mild febrile illnesses that might be considered tuberculous, while careful clinical observation of the remaining 68 men revealed no manifestation of illness. Of the 568 men whose tuberculin reaction had been positive on admission 4 developed pleurisy, one pleurisy with parenchymal infiltration and one ulcerative phthisis. The tuberculosis morbidity in the tuberculin-positive group was 1.05 per cent as compared to 5.35 per cent in the group tuberculin-negative on admission. The advisability of vaccinating tuberculin-negative entrants to the army with BCG is suggested.—*La cuti-réaction à la tuberculine dans un régiment d'infanterie, R. L. Debénédetti & E. Balgairies, Rev. de la tuberc., March, 1939, v, 271.*—(*H. L. I.*)

Negro Tuberculosis.—The high death rate from tuberculosis observed among Negroes has been attributed by different investigators to (*1*) racial factors, (*2*) short period of tuberculization, (*3*) constitutional type and (*4*) adverse social and economic conditions. The authors investigated the occurrence of tuberculosis among the Negroes of Macon, Georgia, due consideration being given to their physical characteristics, amount of white admixture and constitutional type, as well as to their economic, social and medical status. Many of the colored population of Macon, Georgia were examined clinically as well as from an anthropological point of view. The data thus obtained were used as the basis of this publication. The nontuberculous population of the community served as a control group for the tuberculous group hospitalized at several sanatoria. The anthropometric studies indicated that the Negroes in Macon, Georgia represented a racially mixed Negro sample which differed anthropologically but little from groups of Negroes studied in Jamaica and in the United States. Since authentic geneological data were not available, the degree of miscegenation present among the Negroes of this community was determined by considering certain non-adaptive physical traits, assigning to each trait an arbitrary numerical value. The physical traits considered fell into three main groups: (*1*) form of lips, shape of nasal wings, nasal indices; (*2*) pigmentation of skin, eye, and hair; (*3*) form and quantity of hair. The cephalic index was found not to bear any relationship to the degree of miscegenation and was, therefore, not taken into consideration. On the basis of the above mentioned physical traits the authors grouped the Negroes studied into those having (*1*) strongly negroid characteristics, (*2*) intermediate characteristics and (*3*) strongly white characteristics. A greater frequency of negroid traits was found among the females. A total of 843 Negroes were studied, 705 of whom were nontuberculous and 138 tuberculous. Of the 425 Negroes presenting strongly negroid traits, 78, or 18.4 per cent, were tuberculous; of the 319 constituting the intermediate group, 44, or 13.8 per cent, were tuberculous, while of the 99 having strongly white traits, 16, or 16.2 per cent, were tuberculous. The authors conclude that neither the incidence, nor, very probably, the resistance to tuberculosis, is significantly different among the miscegenetic type of the American Negro. The relationship of constitutional type to susceptibility to pulmonary tuberculosis was investigated. The most consistent and significant differences were observed in the dimensions of the female pelvis of tuberculous patients. Hip breadth, relative hip breadth, interspinous diameter, pelvic height and pelvic depth were smaller in the tuberculous. The significance of these observations was determined further by comparing the pelvic measurements of 30 Negro females who had died of pulmonary tuberculosis with the same number of Negro females of the same ages who had died of other diseases. No significant differences in the measurements of the pelvic bones of the two groups were detected. The authors conclude that

the smaller pelvic measurement of the tuberculous female is not a constitutional peculiarity, but is due to the loss of soft tissue, especially fat. Differences in the body length of the tuberculous were found to be due to loss of soft tissues, resulting in relative lengthening of the body, rather than a true constitutional peculiarity. This explanation is not valid, however, for stature and acromial height in males and acromial, sternal and xiphoid heights in females. The authors conclude that the differences in measurements found among the tuberculous and nontuberculous can be explained as the result of the disease. Comparisons were made of the economic and social status of the tuberculous and nontuberculous Negro population of Macon, Georgia, and of a group of economically superior Negro students attending a denominational normal school in Macon. The incidence of tuberculosis was not related to the size of the house, number in household, persons per room, persons per bed, beds per room, ownership of home, rental rate or occupation. The Wassermann reaction was found positive in 21.2 per cent and in 19.9 per cent of the tuberculous and nontuberculous respectively. Among the tuberculous in Macon, Georgia a history of tuberculosis among their relatives was encountered in 25.9 per cent of the cases, while among the nontuberculous and among those attending the normal school 8.3 and 2.3 of their relatives respectively gave a history of tuberculosis. Tuberculous patients possessing strongly negroid traits had more tuberculous relatives than the tuberculous patients of the other two groups. A history of tuberculosis contact was found in 39.3 per cent of the tuberculous patients, while among the nontuberculous general population such a history was obtained in 8.8 per cent, and among those attending the normal school a history of contact was obtained in 2.4 per cent. The spread of tuberculosis among the Negroes of Macon, Georgia is attributed to the scattering of large numbers of tubercle bacilli in overcrowded homes. This is evidenced by the fact that a high percentage of tuberculous cases came from homes where a history of tuberculosis contact was obtained. The authors criticise the prevalent practice of offering hospital facilities only to those whose chances for recovery are good, permitting the far advanced cases of this disease to remain at home to continue to infect others. They recommend the identification and isolation of the infected individuals and improvement of living conditions of the general population.—*Tuberculosis in the Negroes of Georgia, Economic, Racial, and Constitutional Factors, G. D. Williams & J. D. Applewhite, Am. J. Hyg., March, 1939, xxix, 61.*—(*J. D. A.*)

Tuberculosis in Students.—In American elementary and high schools the proportion of positive tuberculin reactors among children is steadily falling. The incidence in rural areas is significantly lower than in urban. Important disease is first met with in high school students, where the combined incidence of latent and manifest disease varies from 1.5 to 3 per cent, being higher in girls. The basic principles of control programs are mass tuberculin testing, X-ray examination of positive reactors and provision of suitable care for those with lesions. In colleges about 6 per 1,000 students have adult type tuberculosis, or about 6,000 students in all American colleges. The average infection incidence throughout the country is 30 to 35 per cent, with geographical variations. Students of medicine and nursing are subjected to a special hazard, hence examinations should be given at more frequent intervals, with X-ray films indispensable. Among nurses there is encouragement in the prompt response to treatment.—*The Incidence and Prevention of Tuberculosis in American Schools and Colleges, E. R. Long, Tubercle, March, 1938, xix, 241.*—(*A. P.*)

Tuberculosis in Scandinavian Students.—At Lund, Sweden of 3,294 tests completed up to May, 1937, 81.5 per cent gave positive reactions initially, of which 73.5 per cent reacted to the first test (Pirquet). In the medical students, in contrast to the probationer nurses at Oslo, there was no preponderance of tuberculous illness in the tuberculin-negative group; however, the total tuberculosis morbidity was four or five times as high as for all other student groups (70 out of 638 as compared with 63 among 2,698) and mostly appeared within the first two years after beginning studies. In Copenhagen, Denmark, up to the middle of 1937, 75 per cent of the 1,608 medical students were initially tuberculin-positive (Holm and Helwig-Larsen) and of the 416 tuberculin-negative 109 later became positive, 27 after injection of BCG and 82 spontaneously. Among the initially tuberculin-positive group were 12 suffering or known to have suffered from pulmonary tuberculosis and 19 with suggested or typical pulmonary lesions shown by X-ray. None of the remaining 1,161 has developed any tuberculous illness or discernible X-ray change over 1,554½ person-years observation. However, among the 82 subsequently infected (naturally) after being originally negative, there were 19 cases of tuberculous

illness, of whom 5 were bacteriologically proved and one died of phthisis. Thus, in both Copenhagen and Oslo, new cases of tuberculous illness appeared chiefly in the group primarily infected during observation. The divergent results of the Swedish investigations (at Lund) led to inquiry concerning exposure to infection during the preclinical studies. The apparent difference in prevalence of infection between Norway on the one hand and Sweden and Denmark, on the other, may be variously explained. It is now generally agreed that the readings should be made forty-eight to seventy-two hours after the tests, and that there will be a certain number of indeterminate reactions with either the Pirquet or Mantoux test. The problem of phthisis in the young adult is not solved even by the earliest diagnosis. Detection of small localized opacities by roentgenographic methods merely calls for careful and prolonged observation, as it is not practical nor sensible to submit all such to costly interruption of their studies. Regarding BCG vaccination, there is a steady accumulation of clinical evidence that it protects against harmful primary tuberculous infection. Although its use is increasing in Scandinavia, in England it has hardly been used nor can rationally be until tuberculous infection and morbidity rates in different age groups are more carefully established.—*Investigations upon Tuberculosis among Students in Scandinavia, A. L. Jacobs, Tubercle, August, 1938, xix, 481.*—(*A. P.*)

Tuberculosis in Student Nurses.—Heimbeck first determined the incidence of tuberculosis among young adult women in Norway by examining young girls and then following them up methodically through adolescence and early adult life under ordinary living conditions. He then compared these observations with those made on young women taking up the nursing occupation and observed before and during their course and followed up afterwards. In order to determine the relationship of tuberculosis to such specific employment the already diseased and infected, that is, tuberculin-positive, have to be ruled out or considered only for purposes of comparison. The Pirquet test was used to determine infection. The investigations were begun in 1924 and included the middle class of Oslo, the entire population of Trondheim and the rural population of different districts in Norway. It was found that from 26 to 40 per cent were infected at fifteen, 40 to 58 per cent at twenty-one. The age group thirteen to twenty-four was selected in order to find a general expression of the state of infection and morbidity from puberty upward and the age group twenty to thirty in order to have an identical age group for comparison with the nurses. The general tuberculosis morbidity among girls worked out separately for the two groups, originally tuberculin-positive and originally tuberculin-negative, has to be based on the total number of years under observation. For Pirquet positive persons (2,111 person-years), it comes to 6.6 per 1,000 observation years, compared with 5.5 for a comparable group of young men. For Pirquet negative persons (4,697 person-years), it comes to 11.1 per 1,000 observation years. Of this group, 226, or 24.8 per cent, became infected, and of these, 52, or 23 per cent, developed tuberculous disease. From the foregoing it is assumed that the rate of infection for the previously uninfected of this sex-age group is 45.6 per 1,000 observation years, and the morbidity attributable to primary infection is approximately 25 per cent. The tuberculosis morbidity among young women of twenty to thirty was similarly estimated. For the Pirquet positive persons (1,364 person-years) it was 4.4 per 1,000 observation years. For the Pirquet negative persons (871 person-years), it is 23 per 1,000 observation years. During the period of observation 73, or 26.2 per cent, became infected, and of these, 20, or 27.4 per cent, developed tuberculous disease. This gives an infection rate for the previously uninfected of 83.7 per 1,000 observation years and a morbidity attributable to primary infection of 28.5 per cent. In tuberculous diseases were included: erythema nodosum, 25 cases in the originally tuberculin-negative group, three of these also showed other manifestations of tuberculosis; pleurisy, 22 cases, 2 associated with pulmonary tuberculosis, all but one occurred in the originally tuberculin-negative group; pulmonary tuberculosis, 38 cases, these were more evenly divided between tuberculin-positive and negative groups; glandular tuberculosis occurred in 5 cases. Observations among nurses were carried out at the Ullevaal (Oslo) Municipal Hospital, which is a general hospital. Tuberculosis patients are admitted not only to the special tuberculosis section but to the medical, surgical and other departments. There are in all 2,600 beds, of which approximately 400 are occupied by patients with tuberculous conditions, chiefly open pulmonary tuberculosis. There is a three-year training school for nurses, admitting healthy women of an average age of twenty, about 110 to 120 per year. The percentage of tuberculous infection on entrance has varied between 34 and 53 per cent. During their

nursing course the number of infected individuals increases from less than 50 to 100 per cent, an increase which would ordinarily take a period of twenty years or never be attained. The observations as to developments later comprise all age groups from 1924 to 1936 and followed to 1938, that is, two to fourteen years. From 1927 on there has to be considered, in addition to the originally tuberculin-positive and negative groups, the BCG group of individuals originally negative and vaccinated with BCG, but this group is not included in the tabulations. The probationer group, totalling 752, showed the highest annual tuberculosis morbidity, 34.3 per cent for those originally negative and 1.2 per cent for those originally positive, a striking difference. The appearance of tuberculous lesions commences early, the first two six-months' periods especially showing a striking incidence of tuberculous manifestation. Most initially negative, became positive within two to three months. Numerically, pulmonary tuberculosis, occurring in 34 cases, was the most frequent manifestation but occurred as often among the initially positive, although all the deaths (7) were in the other group. Pleurisy, however, with or without other lesions, occurred in 31 cases, 23 of whom were among the initially negative. If we include cases of "pulmonary infiltration" under pulmonary tuberculosis there will be 45 additional cases, mostly occurring in the tuberculin-negative group. [The term is not explained by the author who, perhaps, has applied it to cases showing pulmonary lesions without the characteristic clinical picture of pulmonary tuberculosis. This seems especially likely as no deaths are recorded among these.] Erythema nodosum alone comprises 24 cases, and with other manifestations, 27 cases, 51 in all, which would actually make it the most frequent. Heimbeck has also attempted to differentiate between so-called "benignant" and "malignant" forms of tuberculosis. Among the former he includes glandular tuberculosis, erythema nodosum, pleurisy and "pulmonary infiltration;" among the latter, pulmonary, renal and bone tuberculosis, peritonitis, meningitis and miliary tuberculosis. There were 75 "benignant" forms and 29 "malignant," of whom 13 died. No case contracting tuberculosis remained tuberculin-negative. In the work of nursing tuberculous patients the infection risk is exceedingly great, the annual increment being five times that under ordinary conditions. Of the newly infected, 34.3 per cent have been shown to develop tuberculous disease. Even among the tuberculin-positive the morbidity is double that among women of the same age under ordinary conditions. In addition to other factors, exogenous infection must be regarded as playing a decisive part.—*Incidence of Tuberculosis in Young Adult Women, with Special Reference to Employment, J. Heimbeck, Brit. J. Tuberc., July, 1938, xxxii, 154.* —(*A. P.*)

Tuberculosis among Students.—A student health department must decide whether the persons matriculating are healthy and capable of carrying the burden of a college course. Allowing persons with clinically latent but pathologically active disease to continue without medical supervision is obviously dangerous. That more than the routine examination is desirable is well illustrated by this survey and the potentialities of a tuberculosis program to find minimal cases is strongly implied. All students entering the University of Wisconsin for the first time are given a tuberculin test. Those with a negative reaction to .005 mg. of PPD are regarded as free of disease. All students not reacting to the test are requested to report for a retest each year. Students having a positive test at the time of enrolling in the University or who later become positive receive a single postero-anterior X-ray film of the chest. Those with no former lesions are reëxamined at twelve to eighteen month intervals by fluoroscopy. When any suspicious shadow is noted during the fluoroscopic examination an X-ray film is requested. In five years over 16,000 students were examined and over 15,000 were tested by a two-dose method and over 1,000 were tested with a single strong dose. The two-dose method was found to be preferable, for unless a stronger first dose had been used all the active cases of tuberculosis would not have been found as 16 of the 71 active cases did not react to the weaker dose; and had a one-dose method been employed, as is used in case-finding elsewhere, only 57 per cent of the infected cases would have been found. A smaller infection rate was found among the women (24.0 per cent) than the men (29.5 per cent) but the incidence of active disease was higher among the women. In a group of 2,944 infected men, 1.63 per cent were found to have active disease while 1.8 per cent of 1,272 women had active disease. The highest infection rate was present among students from the East and the lowest occurred in those from the North Central and Mountain States. A high infection rate was also noted in the Desert States, foreign countries and Southern States in the order named. The lowest rates in Wisconsin occurred in the rural group and the results

suggest a correlation between the number of students infected and the death rate or infection rate of the section from which they come. The rate of increase of positive reactors was highest among the men. The whole group showed a yearly increase of about 4.5 per cent. Roentgenograms were made of 4,216 students. There was no evidence of pulmonary tuberculosis in 3,003, calcified lesions were found in 1,022 and noncalcified parenchymal lesions in 191. No attempt was made to classify the lesions as first infection or reinfection as experience in this survey indicates that without proof of when infection occurred it is not possible or justifiable to attempt to make this distinction. The 71 active cases found during the five-year period give an average of 14.1 cases per year as compared with four per year in the period of 1919 to 1933—an increase of 340 per cent. This increase is largely due to the methods employed. Parenchymal lesions were found to develop more often in those without calcification. In 71 active cases only 12 showed calcifications in the parenchyma or hilum and in only 8 cases was the calcification distinct from the parenchymal lesion. These findings suggest that it may be wise to reëxamine positive reactors showing no calcification more frequently. A difference of opinion exists as to the benignity of lesions produced by the first infection and reinfection. As a result of experience in this survey, it is believed that progressive infection may develop from a first infection. Four students with recent infections showed lesions that could not be regarded as benign. Two students developed cavities from a first infection lesion and subsequently developed signs and symptoms. After one and two years' treatment they are still in the Sanatorium. A third continues to have tubercle bacilli in the gastric contents after two years' treatment. Because of the multiple factors involved in determining the course a tuberculous process will take, one may question the advisability of stating whether a first or reinfection produced the lesion and delaying treatment when the former is suspected. Many also have concluded that the infected group has developed a relative immunity. This contention may be answered in part by the fact that the group no longer contains those who may have developed progressive disease from their first infection and that, therefore, such a group of individuals, showing no progressive disease, probably represents those who have proved their inherent resistance which may have been further enhanced by the first infection. But the noninfected have not established their status. Since time may be lost in waiting for serial films to demonstrate the course of a lesion, other tests are of value and should be employed. One of the most important is repeated examination of gastric contents. All of the 50 minimal cases had negative sputa, but 18 per cent had positive gastric contents on staining the centrifuged specimen, and 72 per cent of the minimal cases and 82 per cent of all cases had gastric contents positive on guinea pig inoculation. The pleural fluid in three cases of pleurisy with effusion was negative for tubercle bacilli on repeated examinations, but the gastric contents were positive. Repeated study of the total and differential blood count may also indicate the course of the disease before the X-ray film shows any change. The sedimentation rate usually shows an increase before symptoms develop, but frequently is normal in minimal cases. Among the 71 active cases, 4 developed lesions within nine months after the tuberculin test became positive. The disease was unilateral in 40 and bilateral in 26. Sixteen per cent of these had calcified lesions whereas 25 per cent of the positive reactors showed calcified areas. The gastric contents were positive in 43 of the 48 cases examined but the sputum was positive in only 10 out of 69. The sedimentation rate was increased in 33 out of 69 cases and the Mantoux test was negative to the smaller dose in 16. Pleurisy with effusion was present or had occurred in 10. Out of state or foreign students accounted for 15 cases. Two cases are described in detail. A favorable course has been the rule in the majority receiving treatment and there have been no fatalities. At the time of diagnosis there were 43 with minimal lesions, 18 with far advanced lesions, 4 with moderately advanced disease, one with miliary infiltration and 5 with pleurisy with effusion. A percentage of 41.4 minimal cases compares favorably with the 13 per cent for the country as a whole.—*A Review of a Five-Year Tuberculosis Program among University of Wisconsin Students, R. H. Stiehm, Am. J. M. Sc., April, 1939, cxcvii, 517.*—(*G. F. M.*)

Medico-legal Aspect of Tuberculosis.—Some facts of medico-legal importance in cases of tuberculosis arising in the Swiss army are pointed out. The question of exogenous or endogenous infection, the possible interdependency of military service and beginning disease are discussed in detail. On account of recent researches on twins and families a more definite evaluation of the constitutional factor seems advisable. On the other hand, simple colds should not be neglected. An X-ray film should be made in each case of a cold that lasts more than

three weeks.—*Die Tuberkulose als Gegenstand der Begutachtung, W. Löffler & M. Kartagener, Schweiz. med. Wchnschr., June 3, 1939, xxii, 489.*—(*A. B. T.*)

Tuberculosis and Life Insurance.—There is no test to decide when tuberculosis is finally arrested and there is some doubt as to whether one who has had the disease has a greater susceptibility to reinfection in the future. Advances in diagnosis and treatment during the past twenty years may account for the varying practices of leading London offices. After the disease is arrested, offices vary in a waiting period of from two to ten years before considering a policy. Even after ten years and when the individual is forty years old the policy is loaded up £1 to £2 per cent. Some offices consider pleurisy with effusion as evidence of active disease at the time and several offices regard all haemoptyses as evidence of active disease. When there is a family history of tuberculosis the offices are unnecessarily harsh. When tubercle bacilli are in the sputum a policy should be denied. If recovery has apparently occurred, three years should elapse with negative sputum before recommending a policy. After this time anyone should be considered. A recent X-ray film should be required. A load of 15 per cent would be reasonable. It would be better to wait until five years had elapsed when better rates could be obtained. Primary pleurisy with effusion is probably tuberculous in 80 per cent of the cases and it is wise to wait for five years of good health and a normal X-ray film before insuring. It is probably true that 50 per cent of cases with haemoptysis never develop any evidence of pulmonary tuberculosis. If a period of twelve months elapses after the haemoptysis and the chest film is normal there is no need to regard later development of tuberculosis as probable. The majority of young adults who develop spontaneous pneumothorax never develop tuberculosis and should be accepted at ordinary rates if the X-ray film is normal. All offices are too harsh where there is a family history of tuberculosis because domiciliary contact is more important than family history. Pulmonary tuberculosis in a parent or in two collateral relations should not preclude a policy at ordinary rates.—*Pulmonary Tuberculosis in Relation to Life Insurance, A. H. Gosse, J. Roy. Inst. Pub. Health & Hyg., August, 1939, ii, 473.*—(*L. F. B.*)

Primary Tuberculosis.—Primary tuberculosis of the lung in childhood does not commonly give rise to any signs or symptoms, and the lesion passes through its various phases without showing any evidence of its existence, except in the X-ray film. It is the complications occurring during the initial and healing stages which give rise to symptoms and signs and sometimes to death. Therefore, it is only possible to study the pathology of simple primary tuberculosis in children who have died from some other cause. This has been done by others, particularly Blacklock. At the Brompton Hospital 850 children with a positive tuberculin test have been observed over periods extending up to eight years. Two hundred and two of these showed X-ray changes which were regarded as due to primary tuberculous lesions. This diagnosis was based on the following evidence: (*1*) the deposition of calcium in the lung lesion and/or in the corresponding hilar nodes; (*2*) laboratory evidence of pulmonary tuberculosis, such as the presence of tubercle bacilli in the gastric contents, or removal of tuberculous material through the bronchoscope. None of the children had a positive sputum. Eighty-five per cent of those showing a lesion were known to have been in contact with cases of open tuberculosis. The lesions in this series could be grouped as uncomplicated primary lesions and complicated primary lesions. The typical roentgen appearance was an opacity in the lung parenchyma varying in size and appearance in different children. In some it was quite inconspicuous and was overlooked entirely until later radiograms with calcification gave an indication of its position. The opacity was more or less rounded in shape, of a moderate and even density, with an indefinite outline. In almost all the cases there was an accompanying enlargement of the hilum shadow on the same side; this also varied greatly in degree, the enlargement being greater, usually, in the younger children. The size of the pulmonary lesion did not appear to determine the degree of lymphatic enlargement. Subsequent X-ray films during the next three to six months showed a slow but steady decrease in size of the lung opacity, together with an increase in its density and definition. After about six months the decrease in size was less noticeable and there was little change until calcium was deposited. The time taken for calcium to appear varied considerably in different cases. A few children did not show calcification until two years after the lesion was first noted, while 2 children had evidence of calcification at the age of ten months. The calcium deposits increased in amount in some cases for another one or two years. The glandular enlargement gradually decreased, and calcified deposits appeared more or less concurrently with

those in the parenchymatous focus. During this period of calcium deposition, which sometimes takes up to four years, the lesion must be considered as healing and, therefore, not truly quiescent. There were most probably other children with primary foci which healed without calcification and without leaving any X-ray traces. Most of these children had no symptoms. There were a few who failed to thrive normally for a long period, sometimes for a few years; these were usually the cases with evidence of a large primary in which heavy deposits of calcium were eventually laid down. In some of the children the glandular lesion was outstanding. This occurred usually in children five years of age and under. The enlargement of the hilum nodes and the spread of tuberculous disease into neighboring structures give rise to the majority of complications. There were cases in this series of lobar collapse due to pressure of nodes upon a bronchus. In 2 cases erosion of a tuberculous node through the bronchial wall was proved by bronchoscopy. In such instances bronchogenic spread may well occur and has been described in the literature; however, it did not occur in this series. Miliary tuberculosis developed in 5 children with enlarged lymph nodes. Three died of tuberculous meningitis, while the other 2 appear to be running a benign course. The primary lung lesion usually lies near the surface of the lung, and at autopsy involvement of the pleura is frequently found. In this series several small effusions were visualized on X-ray films, not infrequently in the interlobar region. These effusions usually cleared within a few weeks and left no permanent abnormality in the radiogram. One or two developed calcified lesions in the position of an original localized effusion. In all cases the effusions were small and did not give rise to any signs or symptoms.—*Primary Tuberculosis of the Lung in Children, A. Margaret C. Macpherson, Brit. J. Tuberc., April, 1939, xxxiii, no. 2.*—(*H. R. N.*)

Primary Infection.—In the prevention of tuberculosis the question arises as to which of the two factors is more preponderant, the immunity that a tuberculous infection produces or the subsequent hazard from such an infection. The authors present a report of a ten-year follow-up of 446 children with positive reactions to tuberculin and 772 children with negative reactions. The positive reactors were regularly followed up; for most of them roentgenograms were taken at intervals of six months to a year and, when clinical tuberculosis was suspected, every one or two months. Of the 772 negative reactors, 412 were located in a survey by the public health nurses. The remaining 360 children were examined in the centre by tuberculin testing or roentgenograms or both. The average age at the first examination for the positive reactors was 7 years and for the negative 6.6 years. The average number of years of follow-up for the former was 11.3 and for the latter 10.95. At the end of the follow-up period it was found that 67 of the positive reactors (15.02 per cent) were sick with the reinfection type of disease, while of the negative reactors only 13 (1.68 per cent) were sick. Thus there were 9 cases of tuberculosis in the positive reactors to one in the negative reactors. The ratio between the mortality for the positive reactors and that for the negative reactors is 38 to 1. It is evident that the infected children had roughly nine times the chance of getting clinical tuberculosis within ten years as did the originally noninfected children. It is also obvious that a tuberculin reaction in a child is of far more significance than was formerly believed. Another fact obtained from these observations is that clinical pulmonary tuberculosis rarely appears until adult life. The average age at which these persons were first found to have the primary tuberculosis complex was 7 years, but the average age at which they were found to have clinical tuberculosis was 18.9 years.—*The Fate of Children with Primary Tuberculosis, P. T. Y. Ch'iu, J. A. Myers & C. A. Stewart, J. A. M. A., April 18, 1939, cxii, 1306.*—(*G. L. L.*)

Chronic Miliary Tuberculosis in Infancy.—This clinical condition was first described by Bard in 1898; later, and better, by Assman in 1913, who called it "chronic miliary." Filla in 1936 reported that, of 500 sanatorium children, 22 per cent had such form of miliary pulmonary tuberculosis; this percentage, however, must be considered actually lower than the true occurrence because of the many times a miliary dissemination will resorb without any appreciable residual roentgenological markings and because further evolution of the process often ends by masking the evidence of the initial haematogenous dissemination. The pathogenesis of chronic miliary disease of the lung is a transitory and intermittent bacillaemia, usually limited to the lesser circulation. This bacillaemia starts from a lymphoglandular focus. The chronic miliary form is influenced not only by the transitory and intermittent nature of the bacillaemia, and perhaps by the virulence of the bacillary strain, but also by the peculiar organic reactivity of the individual. Organic reactivity is the result of two factors, both

equally important. These factors are individual constitution and acquired specific allergic resistance. The histo-pathological findings in these chronic miliary forms are prevailingly productive nodular lesions that evolve, as a rule, toward a peripheral and central fibrosis. This fibrosis is associated with an interstitial new formation of fibrous tissue, that often thickens considerably the pulmonary parenchyma and causes fibrous periarteritis and peribronchitis. Symptoms of chronic fibrosclerotic miliary tuberculosis are usually slight and vague. Onset is insidious, with perhaps asthenia, malaise and transitory headaches. Later one may note dyspepsia, nervousness and some dyspnoea or cyanosis. Fever and cough are usually absent or very slight; general condition remains fair. Lung findings are usually negative, but haemoptysis may often occur and give rise to harsh breathing and adventitious sounds. Sputum and even gastric lavage are almost always negative. Radiological findings are typical, with diminished transparency and nodular dissemination in the midst of a characteristic network of increased bronchovascular markings. This condition usually clears in the radiogram, leaving little or no traces, but occasionally there occurs fibrocaseous dissemination with the typical clinical picture of acute miliary tuberculosis, with involvement of other organs and fatal termination. In other cases the radiogram will show dense localized fibrosis with areas of compensatory emphysema. This last form of chronic fibrosclerotic miliary tuberculosis is very rare, and was noted by Filla in only 1 per cent of his 500 children. Murano here reports the only 2 cases that came to his observation, both ending favorably. Both these children had congenital syphilis, and Murano wonders whether there is any special relation between syphilis and tuberculosis of childhood, and whether congenital syphilis has any influence on the evolution of the tuberculous disease.—*Tubercolosi polmonare miliare cronica ad evoluzione fibro-sclerotica nell'infanzia, G. Murano, Lotta contro la tuberc., January, 1939, x, 10.*—(*S. L.*)

Bovine Infection in Children.—The importance of bovine and avian infection in children is emphasized and a summary of the statistical literature given. Most cases result from ingestion of raw milk or to a lesser extent of other milk products. Direct contagion through contact with open bovine tuberculosis in man or cattle was rarely observed. Transmission through direct contact with tuberculous lesions of the skin and mucous membranes seems more frequent. The incidence of bovine tuberculosis is relatively more frequent in the country, while in cities with a consumption of pasteurized milk the rate is much lower. The difference among various countries is cited, the highest incidence being in England and Scotland. The curves of incidence of primary intestinal tuberculosis and of bovine infection show a certain parallelism. In both, the percentage decreases with age. The possibility of intestinal infection resulting from ingestion of human bacilli should, however, not be neglected. Some meningitis cases have been examined as to their possible bovine origin. Observations with a relatively high percentage have been described in England, Scotland and Denmark. Two papers from Canada with very contradictory results demonstrate that a survey of a relatively small number of cases cannot be conclusive in this question. The rôle of the bovine bacillus in cervical lymph node infections is more important in children than in adults. So far no studies have been made to determine what percentage of this bovine infection is due to primary ingestion and what to secondary exogenous reinfection. In bone and joint tuberculosis the incidence of bovine infection is less frequent, indicating rather a metastatic origin, in contradistinction to lymph node infection. The percentage of lung and bronchial lesions due to bovine infection is nearly the same in children and adults. The fact that only a small number of children have been examined and that on the other hand occupational exposure exists among adults may explain this exception. In dermatological tuberculosis the percentage is again higher in younger people.—*Die Bedeutung des typus bovinus für die Tuberkulose des Kindesalters, Th. Baumann, Schweiz. med. Wchnschr., March 25, 1939, xii, 233.*—(*A. B. T.*)

Whooping Cough and Tuberculosis.—The effects of whooping cough on tuberculosis were studied in 25 children with pulmonary and extrapulmonary tuberculosis. The average duration of observation after the attack of whooping cough was sixteen months. During the attack of whooping cough one child with miliary tuberculosis developed tuberculous meningitis. In 2 other children exacerbations of primary tuberculous lesions developed four months after whooping cough. There was nothing to indicate that the exacerbations were caused by the whooping cough. In the remaining 22 children, there was no increase in tuberculous activity. The tuberculous process retrogressed or remained quiescent in 20 children and progressed slowly without apparent increase in rate in 2 children with extrapulmonary foci.—*Effects of Whooping*

Cough on Tuberculosis, M. Siegel & Esther W. Goldberger, Am. J. Dis. Child., March, 1939, lvii, 506. (From the Authors' Summary.)—(M. B.)

Bovine Tubercle Bacillus from Child's Knee.—A lupus developed in the knee of a child following a wound on the knee from a fall. The lupus was accompanied by an inguinal adenitis and a fistula. A skin reaction to tuberculin was positive. No tubercle bacilli could be found by histological examination of the lupus. Small bits of excised tissue were inoculated into guinea pigs. One guinea pig sacrificed at the end of a month showed at autopsy caseated lymph nodes at the site of inoculation, iliac, mesenteric and tracheobronchial adenoapthy and an enlarged spleen. Lymph nodes, cultured on Löwenstein's medium yielded no acid-fast bacilli. A second guinea pig sacrificed eight months following the inoculation showed the same type of adenopathy. Cultures were again negative for tubercle bacilli but part of the lymph node was inoculated into three more guinea pigs, from which a third passage was made. Two of this series of animals died of intercurrent infections. A third guinea pig sacrificed at the end of seven months showed a generalized tuberculosis at autopsy. Cultures of the organs yielded numerous atypical colonies of acid-fast bacilli. Subcultures were made with great difficulty on glycerin-potato medium and in Sauton's medium. The organisms grew well on a medium richer in potato and containing beef bile. The bacilli proved to be tubercle bacilli of bovine type when inoculated into susceptible laboratory animals. Isolation by culture could be obtained only after three passages probably by reason of the fact that only a few bacilli were contained in the human lesion.—*Isolement d'un bacille tuberculeux de type bovin dans un lupus du genou observé chez un enfant, F. Bloch & M. Ducourtioux, Compt. rend. Soc. de biol., November 26, 1938, cxxix, 734.—(M. T. W.)*

Roentgenograms of Tuberculous Contacts.—A study of 1,852 chest roentgenograms on 584 infants from tuberculous homes varying in age from birth to five years is presented. Among 379 cases with negative Mantoux tests, the incidence of tracheobronchial shadows alone was 6.8 per cent. The incidence of parenchymal shadows was also 6.8 per cent. Among 205 cases with positive Mantoux tests, the incidence of tracheobronchial shadows alone was 9.2 per cent; the incidence of parenchymal shadows was 40 per cent. Increased tracheobronchial shadows persisted more than three months in 26.6 per cent of the negative Mantoux cases, as against 71.3 per cent of the tuberculin-positive cases. Parenchymal shadows persisted on subsequent examination for three months or more in 8 of 16 of the negative Mantoux cases, and in 61 of 66 (92.4 per cent) of positive cases. Infants dying of tuberculosis generally show demonstrable parenchymal shadows on a roentgenographic film. In our series, since miliary tuberculosis was the most frequent cause of death, the diagnosis of lethal forms of tuberculosis by roentgenographic examination was readily made. Increased tracheobronchial shadows in infancy may not be accepted as pathognomonic of tuberculosis, even in the presence of a positive Mantoux test. It appears, however, that a great majority of the parenchymal lesions in tuberculin-positive infants are probably tuberculous in nature.—*A Study of 1852 Chest Roentgenograms of Tuberculous Contacts under the Age of Five Years, H. A. Rosenberg & M. A. Levine, J. Pediat., August, 1939, xv, 224. (Authors' Summary.)—(M. B.)*

Tuberculosis in Children.—Of the 4,328 children under six years whose records were analyzed, 79.1 per cent had negative and 16.4 per cent had positive tuberculin reactions when first tested at the Lymanhurst Health Center. In the remaining 4.5 per cent of the group the results of the initial tuberculin test were inconclusive. Roentgen study of over 1,700 children who were not sensitive to tuberculoprotein consistently failed to reveal any lesions suggestive of tuberculosis. Of the 709 children who were sensitive to tuberculin when first tested, the initial roentgen examination disclosed no lesion in 268, calcification in 286 and pneumonic infiltrations in 155. The incidence of intrathoracic calcification tended to increase with advancing age. This statement applies to the calcium deposits in the lung parenchyma as well as to those in the hilar lymph nodes. The incidence of pneumonic infiltration interpreted as primary pulmonary tuberculosis in the acute inflammatory stage of development decreased greatly with advancing age. Of the 629 children who had positive tuberculin reactions on entering Lymanhurst Health Center and were traced, 619, or 98.4 per cent, were alive at the end of an average follow-up period of five years. The 10 children who died of tuberculosis were members of the 0 to 1 and the 1 to 2 year age groups, in each of which 5 fatalities occurred. Eight of these 10 children who died remained in intimate contact with persons in their respective homes who were known to have open tuberculosis. Nine of

the children who died of tuberculosis had pneumonic infiltrations deemed representative of primary pulmonary tuberculosis when they were first examined. In the remaining child the initial roentgen study revealed calcified lymph nodes. The pneumonic primary tuberculous infiltrations found on the first roentgen examinations of the 146 tuberculin-sensitive children who controlled and survived this form of the disease resolved spontaneously in each instance. This resolution left the lungs roentgenographically normal in 100 children and produced Ghon tubercles in 46. Of the 3,424 children who failed to react to tuberculin when first tested, 157 later became sensitive to tuberculoprotein. Roentgen studies made after these primary infections were acquired revealed normal lungs in 91 children, pneumonic infiltration in 17 and intrathoracic deposits of calcium in the remaining 49. Not one of the 157 children died of tuberculosis in the period during which they were followed. During the course of the follow-up study, 22 children who previously were sensitive to tuberculin lost their sensitivity and gave negative reactions to repeated intracutaneous injections of 1 mg. of Old Tuberculin.—*Tuberculosis in Children less than Six Years of Age, J. Tortone, A. Chattâs, J. A. Myers, C. A. Stewart & T. Streukens, Am. J. Dis. Child., July, 1939, lviii, 92. (Authors' Summary.)*—(*M. B.*)

Bronchogenic Spread in Children.—In children bronchogenic spread is often not pulmonary but lymphoglandular in origin. The primary focus, an area of caseous alveolitis often connected with a bronchus, may be a source of bronchogenic spread before encapsulation has occurred depending upon the tendency of the focus to liquefy, its size and its relation to a bronchus. The presence of an area of rarefaction roentgenologically and the presence of tubercle bacilli in the gastric contents may be taken as confirmatory evidence of bronchogenic spread from a primary focus. Spread from pulmonary cavities developing after the initial infection plays a small rôle in pulmonary tuberculosis in children and is similar to that process seen in adults, where its rôle is more significant. More frequently than is believed, perforation of a caseous hilar lymph node into a bronchus occurs in children and results in bronchogenic spread. Clinically glandular perforation is recognizable only when it is acute and presents marked symptoms: severe cough, hyperpyrexia, expectoration of caseous or calcified masses and a positive sputum. More gradual, less dramatic perforation, with the production of endobronchial granulation tissue, cannot be diagnosed, unless it results in lobar atelectasis, and then the diagnosis can be made in retrospect. It is in these cases that tubercle bacilli may be found in the gastric contents without roentgen evidence of an open pulmonary lesion. When a single calcified mass perforates into a bronchus, there is generally no bronchogenic spread, but atelectasis may occur if the mass remains lodged in a bronchus. Several methods of investigation are suggested to facilitate the diagnosis of perforation of a hilar node into a bronchus. Bronchoscopy is valuable but useful only in selected cases. Bronchography by means of lipiodol may be diagnostic but is recommended with caution because of the danger of intracanalicular spread of tubercle bacilli. On the routine chest films, however, bronchial outlines can be visualized frequently, and variations in the hilar contour or the disappearance of previously noted calcific hilar shadows by serial roentgen examination may aid in the diagnosis. Similarly tomographic studies have been found useful. The effects of complete or partial bronchial stenosis, moreover, are often clearly visible on the X-ray film. When stenosis is complete and lobar atelectasis is present, the diagnosis is comparatively easy. Occasionally, however, atelectasis must be differentiated from perifocal inflammation, caseous pneumonia, pleurisy and pulmonary infarction. The results of partial bronchial stenosis have been less completely studied and consequently less well known. In some cases partial bronchial stenosis results in obstructive emphysema and can be visualized on the X-ray film; experimentally, small areas of nonspecific pneumonia, due to sputum retention and secondary infection, have been found. Ulcerated forms of tuberculous bronchitis may be a source of bronchogenic dissemination and present in children the clinical syndrome described by Samson and others. These ulcers are amenable to local bronchoscopic treatment. The author concludes that the recognition of the roentgen unity of the hilar nodes and the bronchi in the various phenomena that occur during the course of pulmonary tuberculosis in children will lead to the correct interpretation of a massive pulmonary shadow as atelectasis, and a spread of questionable origin as bronchogenic.—*Über die bronchogene Streuung bei der endothorakalen Tuberkulose des Kindes, R. W. Muller, Ztschr. f. Tuberk., May, 1939, lxxxii, 214.*—(*A. B. C.*)

Negative Tuberculin Reactions in Children.—Mantoux tests were performed on 55 children from poor, unhygienic sur-

roundings between the ages of nine and twelve. The first tests were made using 0.05 mg. OT. With negative reactors, the test was repeated with 0.1 mg. and 1.0 mg. at one month and eighteen-day intervals, respectively. Forty-two children had positive reactions, while 13 remained negative to all three dilutions. These results were compared with chest X-ray films taken during the period of the tests. In only one child was active pulmonary tuberculosis present. Using as evidence of a previous tuberculous infection the presence of calcifications in the hilar region and pulmonary parenchyma, it was found that there was an agreement of the X-ray findings and the tuberculin reaction in the 42 positive reactors. Among the 13 negative reactors, in 5 children there was no roentgen evidence of previous infection, while in 8 children a contradiction existed between the negative tuberculin reaction and the positive roentgen findings. These negative tuberculin reactions were interpreted as the result of complete healing of a previous tuberculous focus with disappearance of antigens from the body and therefore an inability to produce antibodies in response to the injection of tuberculin. These observations are of epidemiological importance since they show that a negative tuberculin reaction does not indicate that the body has escaped a tuberculous infection. This investigation, in addition, demonstrates the characteristic resistance to active pulmonary tuberculosis of the nine to twelve year age group, in contrast to the older age group, fifteen and older, which develops pulmonary tuberculosis in greater number, the result of a resistance lowered by puberty.—*Über die Tuberkuloseinfektion von Kindern im Alter von 9–12 Jahren, N. B. Oekonomopoulos, Ztschr. f. Tuberk., May, 1939, lxxxii, 233.*—(*A. B. C.*)

Pulmonary Tuberculosis in Children.—One hundred and twelve children with positive sputum and active pulmonary tuberculosis were observed in a sanatorium for a period from two to eight years and the results reported. The children were from three to fifteen years of age. Up to the age of ten the cases were equally distributed among both sexes, but from the age of ten to fifteen there were three times more females than males. A similar ratio has been described by other observers and is attributed to the earlier onset of puberty in females. A history of contact with open cases of pulmonary tuberculosis was obtained in 81 instances. Ninety-eight of the children had exudative or caseous pneumonic disease; gastrointestinal and laryngeal involvement was present in one-fourth of these. Seventy-five children were treated with surgical collapse measures, pneumothorax being employed most frequently. Of the surgically treated children 43.9 per cent were dead at the conclusion of the period of observation, 29.4 per cent were progressive, and 26.7 per cent were improved. Of the conservatively treated children, 33 in all, 75 per cent were dead within the same period. While the results of surgical collapse are approximately the same as those for the entire group without a reduction in the mortality, the prolongation of life in the surgically treated was 3.2 years, while for the conservatively treated children it was 1.8 years. In general the prognosis is better at the end of puberty than before it, and slightly better for males than females. The importance of general hygienic measures, a diet rich in vitamins, the care of the teeth, and adequate educational and occupational facilities for the child in the tuberculosis sanatorium is emphasized, as well as the necessity of isolating all open cases of pulmonary tuberculosis in children as a means of preventing the spread of tuberculosis.—*Indikation und Ergebnisseder Anstaltsbehandlung der offenen Lungentuberkulose im Kindesalter, W. Pietsch, Ztschr. f. Tuberk., March, 1939, lxxxii, 28.*—(*A. B. C.*)

Contralateral Pneumothorax.—Pneumothorax on the side of the healthy or less involved lung often has a beneficial effect on the opposite lung. When pneumothorax therapy on the side of the principally diseased lung is made impossible by adhesions, one may hesitate, particularly in children, to advise thoracoplasty or extrapleural pneumothorax. Under these circumstances a trial of contralateral pneumothorax is justifiable. Cases are reported illustrating its successful use with unilateral and bilateral disease. In one instance, pneumothorax on the side of a healthy lung was used in conjunction with a partially successful homolateral pneumothorax to achieve a satisfactory result.—*Intérêt pratique de l'effect contre-latéral du pneumothorax dans le traitement de la tuberculose pulmonaire de l'enfant, P. Lowys & H. Delhumeau, Rev. de la tuberc., November, 1938, iv, 990.*—(*H. L. I.*)

Pulmonary Tuberculosis in Adults.—To determine the mode of infection resulting in adult pulmonary tuberculosis, the inhabitants, 1,126 in number, were studied in a small village for a five-year period from 1933 to 1938. Physical examinations and X-ray films at yearly intervals provided the data necessary for the investigation. Agri-

culture was the chief occupation; the living standards, especially from a hygienic standpoint, were poor; and 112 individuals were directly exposed to open cases of pulmonary tuberculosis; 94 per cent of all children fourteen years of age had positive tuberculin reactions, from which it is inferred that all the inhabitants, fifteen years or older, have already been infected. During the five-year period of observation, 28 new cases of tuberculosis were discovered, the greatest morbidity being in the twenty to twenty-four year age group. While 2 of these cases developed extrapulmonary tuberculosis, the remaining 26 developed pulmonary tuberculosis which was infiltrative and confined to the apical and infraclavicular regions for the most part. Sixteen of these new cases were normal clinically and roentgenologically when first seen, and in 75 per cent of these could a new infection, one to two years before the development of the disease, be established as an aetiological factor. In the remaining 12 cases X-ray films showed inactive pulmonary tuberculosis at the beginning of the investigation, and 66 per cent of these demonstrated a new infection. From these findings the author concludes that repeated exposure to open cases of pulmonary tuberculosis is a greater danger to already infected adults than any other exogenous factor like physical strain, puberty or pregnancy, and is more significant than endogenous lymphoglandular reinfection.—*Zur Ätiologie der tuberkulösen Lungenerkrankung der Erwachsenen, M. Malojčić, Ztschr. f. Tuberk., March, 1939, lxxxii, 7.*—(*A. B. C.*)

Relapse in Tuberculosis.—This paper is limited to those who have required observation or treatment for definitely established tuberculosis of lungs or pleura and have become afebrile and able to undertake moderate exercise. Young uses the following classification of relapse: (*1*) Relapse of recognizable existing lesions, by tuberculous changes of local origin, by secondary cavitation and by "allergic flare." (*2*) Appearance of new areas of disease owing to bronchogenic spread and to "allergic flares." Tuberculous changes in old lesions should not occur if treatment has been successful. Adequate after care should consist of trying to prevent undue strain beyond the patient's physical limitations. Causes of failure: (*1*) Failure to correctly estimate the toxaemia. (*2*) Failure to correctly assess the condition of the lesion. Routine X-ray films once a month are urged for patients under active treatment. If this is unduly expensive fluoroscopy may be substituted provided it is properly carried out. (*3*) Failure to appreciate the importance in treatment of prolonged bed-rest. Secondary cavitation is a term applied to new areas of necrosis which may occur after intervals of comparative health. Owing to associated changes in the lung, these seldom heal without collapse therapy and usually it must be surgical and not unduly delayed.—*What Can Be Done to Prevent the Tuberculous Patient from Relapsing?, F. H. Young, Brit. J. Tuberc., October, 1938, xxxii, 216.*—(*A. P.*)

Relapse in Tuberculosis.—Attention to the financial side is even more important than to the clinical because of attendant privations and lowering of income. Most employers may be said to treat their employees well if there are reasonable possibilities of recovery but some patients begin with the severe handicap of loss of livelihood. A strong After-Care Association in contact with all large employers of labor could help a great deal. The next problem is that of the family income while the patient is hospitalized. A sympathetic Public Assistance Committee and a considerate Relieving Officer can go a long way. A small pension would help, also abolition of waiting lists but this involves the problem of adequate institutional accommodation both for treatment and observation. Rehousing of the tuberculous helps in two ways, that of improved environment for the patient and also of better facilities for keeping contacts from him. Under the Sheffield scheme Public Health Committees pay the whole or part of the rent under stipulated conditions. Workshops for the tuberculous who have recovered should help, also boarding out of children and provision of extra nourishment. Dispensary organizations should be efficient and clinics held at convenient hours and accessible places. Employment of X-ray films is valuable but personal examination should not be neglected.—*What Can Be Done to Prevent the Tuberculous Patient from Relapsing?, G. C. Williams, Brit. J. Tuberc., October, 1938, xxxii, 208.*—(*A. P.*)

Healing of Tuberculous Cavities.—Though this problem at first appears very simple, the mechanism involved in the healing of cavities is so complex and variable that an interpretation of its action with accuracy is difficult. One must not be concerned only with the healing of cavities, as though tuberculosis of the lungs were a purely local ailment. It is frequently forgotten that the cavity is but a more common and visible localization of the disease. Tuberculosis is a general disease, of the whole organism, and can be conquered by increasing the defensive powers of the body.

A cavity may anatomically close by local treatment, to reappear, however, if infection is still present in other organs. The concept of the development of a cavity has not materially changed since the classic description give by Charcot. The lumen of a small bronchus is obstructed by cellular proliferation; caseous necrosis with liquefaction of tuberculous products starts the expulsion of this material through smaller bronchial branches, leaving in its place a cluster of small acinous cavities. The final result is, as a rule, one larger cavity, usually round or oval, because of caseation of the pulmonary tissue. The presence of tubercle bacilli in the walls of the cavity is a very important consideration in explaining its increase in size. Healing of cavities depends on many biological factors and varies according to condition of the tissue. Thin-walled cavities of recent date may heal without any visible residual scar, though this is exceptional; they heal more frequently with a stellate cicatricial lesion. Cavities with thicker walls usually heal because of proliferation of fibrous tissue around the cavity, in a concentric and progressive manner, so as to contract its lumen, slowly, leaving a scar more or less visible according to the size and thickness of the cavity and to the age of the lesion. An old cavity in extremely rare instances may attain a clinical healing though persistently open, because of sterile fibrous walls and of free exchange of air through an open bronchus. Atelectasis may be a contributing factor to the closure of cavities, although at times we may see them enlarged and ballooned out because of lobar or lobular atelectasis with bronchial involvement. Occasionally we see a cavity becoming larger during collapse therapy because of a check-valve action of the draining bronchus, due to modified mechanics. The closure of a larger cavity may be only temporary when the processes that had caused the approach of its walls, especially thoraco-pulmonary physiomechanics, cease to influence the process of healing. All processes of healing, however, in order to be permanent must be accompanied by an improvement of the general condition and by the complete disappearance of bacilli. In conclusion, the formation of tuberculous cavities is due to the dominant forces that exist as a consequence of thoraco-pulmonary physiomechanics and also to the difference of pressure inside and outside of the cavity and to its free communication with the draining bronchus. The healing of cavities depends on many factors. It can be obtained through modification of thoraco-pulmonary forces and through changes that occur in the draining bronchus which will permit the coarctation of the cavity walls and the fibrotic processes in and around the cavity. While the healing of the cavities is occurring with the intervention of the defense mechanisms of the whole body, there follows in turn an improvement of local and general symptoms.—*La curacion de las cavernas tuberculosas del pulmon, H. R. Rugiero, Catedra de pat. y clin. de la tuberc., March–May, 1938, 25.*—(*S. L.*)

Spontaneous Healing of Tuberculous Cavities.—Laennec was first to observe such eventuality, and since then several others have reported on its occurrence. In 3 cases observed continuously, spontaneous healing of infraclavicular cavities occurred in a few months and persisted at the time of this report. Two of the cases had been followed up for one and one-half years, the third one for five months. Spontaneous healing occurs in recent cavities, with an ample layer of pulmonary tissue around it. Factors that contribute to healing are, first a stage of resolution of the infiltration surrounding the cavity, which occurs especially when local and general conditions increase the mechanism of defense and healing, and also oppose the progress of the disease. Infiltration is replaced by some emphysema around the cavity, while at the same time a progressive coarctation of the walls of the cavity is going on; this is occasioned primarily by fibrous retraction of connective neoformations in the walls. In a final stage a stellate scar, demonstrable radiographically, and occasionally found at autopsy, replaces the former cavity.—*Contributo allo studio della guarigione spontanea delle caverne tuberculari del polmone, M. Hoffman, Riv. di pat. e clin. d. tuberc., December, 1938, xii, 909.*—(*S. L.*)

Tuberculous Bronchiectasis.—A case report is presented of a six year old white boy ill with supposed chronic bronchitis since the age of four years. The child's father had active pulmonary tuberculosis. A collapsed and mildly bronchiectatic right lower lobe was disclosed by lipiodol injection. Bronchoscopy was done and narrowing of the right lower bronchus reported associated with the presence of a thick grayish membrane. Biopsy of the membrane revealed necrotic granulation tissue, granules of calcification and acid-fast bacilli. Sputum was never abundant and acid-fast organisms were not found in it. The tuberculin test was strongly positive. Several months of rest in bed with no other treatment brought about reëxpansion of the lobe. The dilated bronchi had resumed their normal shape when lipiodol was injected six months later.

It is suggested that tuberculous stenosis of the bronchus caused the collapse and that the bronchi underwent secondary dilatation. —*Tuberculous Atelectatic Bronchiectasis, R. Wilson, J. Pediat., March, 1939, xiv, 368.*—(*M. B.*)

Tuberculosis and Suppurative Infection.—The association of pulmonary tuberculosis with suppurative lung lesion, such as abscess or gangrene, has been recognized for many years. The manner in which the two infections are associated has numerous classifications but may be summarized briefly: active pulmonary tuberculosis followed by pyogenic infection of the lung parenchyma, each taking its independent course, or the latter aggravating the former; pyogenic infection of the parenchyma followed by tuberculosis, the former activating or aggravating the latter directly or indirectly; pyogenic infection followed by tuberculosis resulting from exogenous superinfection or primary infection. A patient with a subclavicular cavity of several months' duration diagnosed tuberculous by the presence of certain symptoms and by the absence of others, and by the presence of acid-fast organisms in the sputum on several occasions, developed acute pulmonary gangrene over a portion of the lung extensive enough to involve the entire tuberculous area. Surgical drainage followed by thoracoplasty resulted in complete recovery.—*Tuberculous Lesion of Lung Eliminated by Suppurative Putrid Infection, with Recovery, S. Berg & R. H. Dieffenbach, J. Thoracic Surg., February, 1939, viii, 316.*—(*L. F. B.*)

Untreated Tuberculosis.—In the course of a case-finding study involving 3,597 white persons in Williamson County, Tennessee there were found 261 unarrested and 149 arrested cases of tuberculosis, as well as 200 cases of latent apical tuberculosis. Manifest as well as latent tuberculosis occurred more frequently among females, and approximately one-third of the cases occurred among those fifty-five years and over, due to the fact that hospital facilities were lacking. These cases were untreated and followed their usual activities. The cases of tuberculosis diagnosed during the period 1931 to 1936 were observed through 1936, and the change in their status up to January, 1937 studied. Manifest tuberculosis, unarrested, was found in 261 instances, 149 were diagnosed as manifest tuberculosis, arrested, and 200 persons were found to have latent apical lesions. Of the 62 cases listed as far advanced, 36 had died from tuberculosis by January, 1937, 19 remained unchanged, 2 were arrested, 2 were reclassified to moderately advanced, while 3 died or were lost. Of the 73 diagnosed as moderately advanced, 17 had died by January, 1937, in 40 instances the disease was unchanged, in 4 it was retrogressed, and in 4 cases it was arrested. Minimal tuberculosis was observed in 111 persons. In 5 persons the disease progressed to a moderately advanced stage; it was arrested in 18. Of the 15 children diagnosed as tuberculous one died from the disease, while one developed far advanced tuberculosis. Of the 15 cases of moderately advanced arrested cases of tuberculosis, 2 became moderately advanced active cases, while one died from tuberculosis. Among the 134 cases classed as minimal arrested, 5 were active in January, 1937. Among the 200 cases classed as latent apical tuberculosis, 6 had developed minimal lesions and 2 became moderately advanced. In 7 the disease became minimal, arrested. A more exact study of the mortality risks according to the first clinical classification, based on the probability of death within the year, was established. It was found that in 66.9 per cent of the far advanced and 27.7 per cent of the moderately advanced cases, the patient ran the risk of dying within three years of the initial classification, while 7.7 per cent of the far advanced, 16.6 per cent of the moderately advanced and 46.6 per cent of minimal cases improved during the same period. During the same period of time retrogression occurred in 27.9 per cent of the moderately advanced, 22.9 per cent of the minimal, 11.9 per cent of arrested minimal and 14.6 per cent of latent apical lesions. By the end of the three-year period 25.4 per cent of the cases originally diagnosed far advanced, 27.8 per cent of those moderately advanced and 29.5 per cent of those minimal were considered as unchanged.—*Tuberculosis Studies in Tennessee. Subsequent Course of Cases Observed in Williamson County, R. R. Puffer, H. C. Stewart & R. S. Gass, Am. J. Hyg., November, 1938, xxviii, 490.*—(*J. D. A.*)

Tuberculous Bronchopneumonias.—They are frequent during the course of pulmonary tuberculosis. Bronchogenic spread is clearly demonstrated in most cases; in some cases, however, clinical and radiological observations fail to reveal a cause for such rapid and massive spread. Pathologically, nodular foci with caseation, and eventual excavation, are found in the bronchogenic spreads; festooned foci surrounded by oedematous, emphysematous or hyperaemic parenchyma are found instead in the other variety. A peripheral area of connective tissue reaction is very frequently seen microscopically in the nodular foci,

while it is not seen in the festooned foci. Progress towards caseation is very rapid in the nodular foci, while a complete appearance of typical granuloma is never seen in the festooned foci. Of these two types of bronchopneumonic foci, the nodular is the result of a spread by endobronchial aspirations and may occur in any form or stage of pulmonary tuberculosis. The festooned foci, on the other hand, prevail in those cases that are usually diagnosed as disseminated tuberculous bronchopneumonias. As implied, these foci appear simultaneously and in large numbers in vast areas of both lungs; this cannot be attributed to aspiration of infected material through bronchi, unless simultaneous rupture of tuberculous foci would occur in numerous pulmonary areas. In some cases, too, we do not see preëxisting lesions in the lungs, such as to justify the hypothesis of a massive invasion of infecting material in the bronchial tree. This grave form of pulmonary tuberculosis is not very frequent and is often confused with other similar clinical pictures. Clinically it is characterized by sudden onset, even while in perfect health, history of clinical tuberculosis being absent. The duration of the illness is short; fever is high, with rare remissions; general condition is always grave; the sensorium is dulled. Oedema of the extremities is noted frequently and a typical diffuse infiltration of the skin, that gives these patients the peculiar appearance of nephritics. There is dyspnoea, and cyanosis of the cheeks and lips. Blood studies show marked anaemia. Examination of the thorax reveals diffuse dulness on percussion and fine scattered mucous râles. Meningeal complications were not observed in the patients included in this study, but intestinal tuberculosis was not infrequent. This disease may occur at any age. Pulmonary localization is, as a rule, in the upper two-thirds of both lungs; these are the fields preferred by haematogenous lesions of any type. All these considerations have been proved by clinical, radiological and pathological observation of 17 disseminated tuberculous bronchopneumonia patients. The authors conclude that in most cases of this disease we should accept a haematogenous spread, offering as an explanation the possible diffusion of tuberculous virus by the haematic route. They believe that this study tends to demonstrate that in pulmonary tuberculosis many episodes with bronchopneumonic symptomatology may be the consequence of haematogenous localizations in a singularly reactive parenchyma.—*Sulle bronchopolmoniti tubercolari, G. Daddi & C. Pana, Ann. Istituto Carlo Forlanini, November–December, 1938, ii, 825.*—(*S. L.*)

Pulmonary Tuberculosis in Aged.—The average tuberculosis mortality for all ages is exceeded by that of the age groups over fifty. While lesions in the aged may remain quiescent and almost symptomless, at times they are rapidly progressive with severe clinical manifestations. The prognosis is generally grave in the presence of caseation. At necropsy fresh lesions may be found similar to those in young adults. Difficulties in diagnosis are common owing to associated bronchitis, emphysema and myocardial insufficiency. The signs and symptoms may be as baffling as in young adults. Joress here reviews 60 cases with ages ranging from fifty to seventy-eight observed by him at the Pulmonary Clinic of the Beth Irael Hospital, Boston and the tuberculosis clinics of the Boston Health Department. Of these he considered 18 to be of chronic fibroid type and 30 fibrocaseous, with 12 "latent" apical. The onset of clinical symptoms was acute in 23, insidious in 37. Weakness and loss of weight were most prominent but cough and expectoration were present in all but 3, dyspnoea in 25 and chest pain in 21. Twelve had fever and night sweats. Physical examination of the lungs showed apical râles in 33, not present in 24, basal râles in 3. Cavity signs were present in 12, and cavitation was shown by X-ray in 26. Follow-up of 52 cases showed 29 improved, 6 unchanged, 9 worse and 8 dead, all having bilateral fibrocaseous disease. Sputum examination was positive in 23 of 52 on direct smear (less than 50 per cent). Pulmonary tuberculosis in the aged should be considered as serious a disease as in the young.—*Pulmonary Tuberculosis in Old People, M. H. Joress, New England J. Med., December 1, 1938, ccxix, 885.*—(*A. P.*)

Vitamin A Deficiency.—To answer the questions as to the relative vitamin-A deficiency in tuberculous and normal individuals, and whether tuberculous patients will respond favorably to vitamin therapy, the authors used biophotometric methods to study the vitamin-A nutrition of two control groups of 229 and 71 healthy individuals, and a group of 197 ambulatory tuberculous patients. Pathological deficiency on the basis of Jeans' interpretation of the biophotometric readings existed in 6.5 and 11 per cent of the control groups, while 53 per cent of the tuberculous individuals were found to be pathologically deficient in vitamin A. The vitamin-A deficiency was found to parallel the severity of the tuberculosis. Among the control groups all persons with a high minimum light threshold adjudged deficient in vitamin A benefited from treatment with halibut liver oil in that

their light threshold was lowered. Previously advocated therapeutic doses of vitamin A in halibut liver oil were found grossly inadequate as judged by the response shown by the biophotometer. Larger doses (up to 200,000 units daily) gave a response reasonably prompt in pathologically deficient and very prompt in borderline subjects.—*Vitamin A Deficiency in Normal and Tuberculous Persons: As Indicated by the Biophotometer, H. R. Getz, G. B. Hildebrand & M. Finn, J. A. M. A., April 8, 1939, cxii, 1308.*—(*G. L. L.*)

Vitamin C in Pulmonary Tuberculosis.—The best method of determining vitamin C is the saturation method which consists of measuring the excretion of vitamin C in urine during a certain period of time in which 150 mg. ascorbic acid are injected daily until the point of saturation. This point is reached when 40 per cent of the amount injected is excreted within four hours following injection. Tuberculous patients in a good condition of vitamin C balance exhibit such a response the first day. Those who show a deficiency of vitamin metabolism require a period from six to thirty days with an average of twelve days depending upon the degree of deficiency. Generally the curve that expresses the daily excretion of the four-hour period runs parallel to the total twenty-four hours' output so that the saturation point of the first day coincides with or is near the saturation point of the second. Exceptions, however, are frequent. The result of this test is expressed by the number of days or the total amount of ascorbic acid required to produce saturation and by the amount of the vitamin injected which is retained until saturation is reached. In order to get a more complete estimate of the vitamin C metabolism the average of the daily spontaneous excretion should be determined a few days preceding the test. Of all methods used for determination of ascorbic acid in urine the reduction method with 2.6 g. dichlorophenolindophenol still offers the least disadvantage. Provided that the dye is properly titrated the results can be relied upon. Patients with advanced pulmonary tuberculosis show as a rule a deficit of vitamin C metabolism which may be attributed to an exaggeration of the oxydo-reducing reactions of the organism. Consequently, to this excessive utilization, the requirement of vitamin C in progressive tuberculosis can be estimated as being between 50 and 100 mg. daily for adults. This deficit, however, seemed to be of no importance as affecting the amount of sputum, the rate of erythrocyte sedimentation, the temperature during the test period. The patients expressed subjectively some improvement, showed increased appetite and a generally improved condition. The authors recommend the supplementary administration of ascorbic acid which in mild cases can be done through a diet rich in fruits. In more serious cases large doses of vitamin C are continuously required and the use of synthetic preparations is justified.—*A Vitamin C na Tuberculose pulmonar, J. Lobo & O. Nebias, Annaes Paulistas de Med. e Cir., April, 1939, xxxvii, 527.*—(*F. G. K.*)

Pulmonary Haemorrhage.—The authors report necropsy studies of 3 patients who died suddenly with acute haemoptysis. In each case, the amount of blood expectorated was minimal, and examination of the tracheobronchial tree and of the stomach indicated that the haemorrhage had been small. Study of the lungs revealed that the pulmonary cavities were free of blood. No evidence of Rasmussen aneurysms could be found. It was only in areas of lung free of tuberculosis that the bronchi contained blood. In these areas the lungs were congested and oedematous and contained numerous ecchymotic foci. These observations led to further studies, in patients dying of massive pulmonary haemorrhage as well as in patients who had history of repeated slight haemoptyses. Again, no evidence of vascular ulceration was found. The significant changes included capillary dilatation, alveolar interstitial haemorrhage and oedema. The authors consider these changes neurogenic and believe that haemoptysis in tuberculous individuals is frequently the result of toxic disturbances of the sympathetic nervous system.—*Les hémoptysies foudroyantes avec rejet minime de sang dans la tuberculose pulmonaire, P. Jacob & H. Brocard, Rev. de la tuberc., April, 1939, v, 394.*—(*H. L. I.*)

Gastrointestinal Symptoms in Tuberculosis.—Inconstant, often vague, gastrointestinal complaints in the form of anorexia, nausea, postprandial epigastric pain, *et cetera*, were found to be early symptoms of pulmonary tuberculosis in 10.8 per cent of the author's series. Since primary tuberculosis of the gastrointestinal tract is infrequent and ulceration of the gastrointestinal tract generally occurs in patients with far advanced pulmonary tuberculosis, four explanations are given to explain the appearance of gastrointestinal symptoms early in pulmonary tuberculosis: (*1*) reflex, disease in the lungs producing reflex disturbances in the gastrointestinal tract through the interrelation of organs; (*2*) allergic, the gastro-

intestinal complaints being sensitivity reactions to the toxaemia, or as the result of autotuberculinization, comparable to the joint manifestations in Poncet's rheumatism; (*3*) nervous, through organic changes in the vagus produced by hilar lymph node involvement; (*4*) constitutional, the asthenic individual with pulmonary tuberculosis, the lability of the vegetative system in this type and the disharmony resulting from the tuberculous infection. The author believes that pulmonary tuberculosis should be suspected in young patients presenting gastrointestinal symptoms for which no organic basis can be discovered and an X-ray film of the chest should be taken.—*Die Bedeutung gastrointestinaler Erscheinungen als Frühsymptom der Lungentuberkulose, W. Otte, Ztschr. f. Tuberk., March, 1939, lxxxii, 20.*—(*A. B. C.*)

Pregnancy and Tuberculosis.—Although it would seem that the mortality rate among tuberculous pregnant females is very high, it must be remembered that the mortality rate from tuberculosis among nonpregnant women in the child-bearing age is equally high. In this study a group of 82 pregnant tuberculous women was analyzed. There were 59 with caseous pneumonic tuberculosis, 8 with resolving exudative tuberculosis and 15 with chronic productive tuberculosis. In this group there were 10 deaths, all of whom had caseous pneumonic tuberculosis. Collapse therapy was used in 47 of the 59 patients who had cavernous tuberculosis. The results of this therapy were equal or superior to those found in other groups. It is felt that pregnancy has no influence on the course of pulmonary tuberculosis. The prognosis for the individual depends on the character of the pulmonary tuberculosis and whether or not this disease can be controlled. If the disease can be controlled, the pregnancy plays no important rôle. Pregnancy should be interrupted only in patients in whom the pulmonary tuberculosis cannot be controlled.—*Studies on the Influence of Pregnancy on Pulmonary Tuberculosis, G. G. Ornstein & I. G. Epstein, Quart. Bull. Sea View Hosp., July, 1939, iv, 420.*—(*A. A. E.*)

Pregnancy and Tuberculosis.—The most widely held opinion is that pregnancy aggravates tuberculosis. This problem is, however, somewhat confused. The approach to this problem must be based not merely on the presence of tuberculosis in a pregnant woman, but primarily on the stage of tuberculosis present. Prognosis and course will vary greatly depending on whether the lesion is of the chronic, fibroid type or of the caseous, active variety. Reactivation of an old, inactive tuberculosis may occur coincidently with the onset of pregnancy. There would appear to be no question that pregnancy itself can reactivate an old pulmonary lesion. The postpartum period is a dangerous time even in women who have apparently borne their pregnancy well. In contrast, the later months of pregnancy seem to be a favorable period. This is probably due to the upward compression of the diaphragm by the uterus, with resulting partial collapse of the lung. Haemoptysis in pregnancy requires careful differentiation between pulmonary tuberculosis and heart disease. The distinction can usually be made by careful clinical and X-ray examination. When tuberculosis has been demonstrated and when the lesion is unilateral, pneumothorax is the best treatment and frequently makes it possible to permit the pregnancy to come to term. When the tuberculosis progresses together with the pregnancy, termination should be considered. Whenever active treatment of the tuberculosis is possible, it is preferable to permit the pregnancy to come to term in spite of the possibility of unfavorable results in the postpartum period. Moreover, termination of the pregnancy does not always halt the progress of the tuberculosis.—*Les rapports avec la tuberculose, Jacob, Progrès méd., October 8, 1938, no. 41, 1353.*—(*H. R. N.*)

Venous Pressure.—Venous pressures were studied in tuberculous patients. Particular interest was given to those with pneumothorax and thoracoplasty. When possible, pressures were taken in both right and left arms simultaneously. In 21 cases reports of simultaneous venous, arterial and pleural pressures, and the volume of air injected were made. One outstanding observation in the study is the instability of the venous pressure under the influence of emotional factors. Venous pressure is rather rarely elevated in pulmonary tuberculosis and is much less influenced by mechanical than by emotional factor. Fluid, pneumothorax and thoracoplasty may cause an elevation of the venous pressure but rather rarely, and such rise is usually unilateral. The elevation following thoracoplasty may be present for long periods of time and is not of absolute value as a contraindication to operation. In pneumothorax patients, the actual insufflation of air does not disturb the venous pressure. The determination of venous pressure is of value in a few patients with pulmonary tuberculosis, but not of value as a routine sanatorium procedure.—*Venous Pressure in Pulmonary Tuberculosis, F. H. Heise & J. H. Steidl, J. Thoracic Surg., June, 1939, viii, 539.*—(*L. F. B.*)

EKG in Pulmonary Tuberculosis.—A study of EKG of 100 sanatorium patients is reported. Patients were chosen especially when they presented subjective symptoms or physical signs of cardiac or circulatory disturbances. Some of these patients were having pneumothorax treatment or had had phrenic nerve surgery. Only 15 pathological graphs were noted, of which only 10 could be recognized as of tuberculous aetiology. The most common change was a predominance of the right ventricle (low S1 and high R3), that was attributed to overwork of the right ventricle more than to a mere shifting of the heart due to pneumothorax or to phrenicoexairesis. Toxaemia may reflect on the myocardium and cause alterations of the auricular complex and extrasystoles, either ventricular or auricular. In toxic or degenerative myocarditis the EKG may show atypical alterations of any wave. Functional block of ventriculo-auricular conduction is rarely noted even when a rather grave myocardial degeneration is strongly suspected. In conclusion, EKG changes in the tuberculous are very rare. They are less infrequent in those patients that give suspicion of myocardial dysfunction; and are rather frequent in patients that present some clinical or radiological signs of organic changes of the heart. EKG is therefore important from the standpoint of diagnosis and prognosis in those patients in whom reëducation to work is contemplated.—*L'esame elettrocardiografico nei tubercolotici polmonari, R. D'Ambrosio, Lotta contro la tuberc., August, 1938, ix, 727.*—(*S. L.*)

Pleural Perforation in Pulmonary Tuberculosis.—This paper is based on observation of 9 phthisical patients with definite signs of pleural perforation observed at the Öresund Hospital in Copenhagen, Denmark. None of these showed evidence of mixed infection, although purulent exudate is the rule, usually containing large numbers of tubercle bacilli. Apart from this the symptoms are variable and often vague. The diagnosis can be made by recovery from the sputum of dyes injected intrapleurally, or by the pressure tests. For this air is introduced into or withdrawn from the pleural cavity and the pressure taken before and after. A return to previous readings is strongly indicative of fistula and the more rapid the time the longer the opening. This test may fail if the fistula is intermittent. Gas analysis of intrapleural gases before and after withdrawal of air from the pleura is valuable for diagnosis. Although a high oxygen content indicates open pneumothorax, a low one does not necessarily mean a closed one. Comparison of samples is necessary. Nine examples are recorded to show that the prevailing view concerning rapid appearance of mixed infection after perforation of the pleura does not necessarily hold. The rule is that the exudate remains purely tuberculous. A technique for repeated gas analysis applicable to patients with pleuro-pulmonary fistula is given.—*On Pleural Perforation in Pulmonary Tuberculosis, H. Harpoth & N. Gad, Brit. J. Tuberc., October, 1938, xxxii, 228.*—(*A. P.*)

Bronchopleural Fistula.—In 1,000 consecutive autopsies of chronic ulcerative pulmonary tuberculosis, bronchopleural fistulae occurred in 78, or 7.8 per cent. Age of the cases varied from eight to sixty-four years, the majority being between twenty and forty. There were 50 males and 28 females. Forty-seven were white and 31 were Negroes. In 67 cases a single fistula was found and in 11, multiple fistulae were observed. Size varied from 1 mm. to 4 cm. In 57 instances the opening was in the upper lobe, 18 in the lower lobe and 3 in the middle lobe. The cases could be classified as those occurring in cases without artificial collapse, those occurring in cases with artificial pneumothorax and those occurring as a result of closed pneumonolysis. Fifteen cases could be placed in the first group. Fistulae occurring in this group were usually associated with, and the immediate result of, an overwhelming, acute caseous pneumonic process. The fistulae lead directly into subpleural excavations that are of recent origin. The origin of the fistula is a subpleural area of caseous lobular pneumonia which has extended to the pleura. There are 33 cases in the group with pneumothorax alone. A clinical diagnosis had been recorded in 21 cases. Methylene blue had been injected into the pleural cavity in 13 cases and in only 5 of these was the dye expectorated. In 17 cases duration of illness was less than one year and in 16 it was from one to six years before the occurrence of the fistula. Greatest frequency was in the two to three year period. There were 23 cases in the group having pneumonolysis and thoracoplasty in addition to pneumothorax. Pneumonolysis had been done in 11 cases. Two types of fistulae were observed: a large fistula opening directly into a cavity, and a small fistula communicating either with a bronchus or a cavity by means of a tract. In 7 cases the fistula could be considered as resulting from pneumonolysis. Among the 33 cases occurring with pneumothorax alone, 19 appeared in less than six months and 14 appeared from one to four years after induc-

tion. The disease in the first group of these consisted of an acute fulminating caseous pneumonic tuberculosis. These findings suggest that it is better to wait until liquefaction and sloughing of caseation and fall of temperature have occurred before attempting pneumothorax. Empyemata are a constant accompaniment of bronchopleural fistulae except where death of the patient occurs before it can develop. A mixed infection is most often found. Symptoms that aid in diagnosis are: sudden, marked increase of intrapleural air with increased pressure, increased collapse of the lung, change in character of expectorated material, a sharp rise in temperature, altered physical signs, expectoration of dye injection into the pleural cavity, and quantitative analyses of gases in the pleural space. In certain instances, temporary closure or permanent healing of bronchopleural fistulae is known to occur.—*Bronchopleural Fistulas Complicating Pulmonary Tuberculosis, O. Auerbach & S. Lipstein, J. Thoracic Surg., April, 1939, viii, 384.*—(*L. F. B.*)

Tuberculosilicosis.—From the roentgenological standpoint the diffuse fibrous and discrete miliary or acinonodular forms of pulmonary tuberculosis somewhat closely resemble silicosis, but their appearances vary according to such factors as bacterial virulence, resistance of the host, morphological and functional changes of the parts involved and frequency and intensity of seeding of the organism. Characteristic of all forms is a tendency to resolution or fibrosis of the lesions with only a mild systemic reaction of the host. Probably more than half of the cases end in healing, and only when trigger symptoms appear, like haemoptysis, cough and expectoration, does the physician suspect a tuberculous basis. In roentgenograms the lesions are characterized by a predominance of fibrous tissue formation, which frequently leads to calcification. In silicosis the changes are essentially the stage of endothelial phagocytosis and the stage of fibrous tissue proliferation. The fibrosis may be predominantly linear or miliary and nodular; often it is mixed. In the absence of further exposure to dust, simple silicosis may progress to a point characterized chiefly by a slight increase in the size of the nodular islands of fibrosis, with only slight aggravation of the resultant emphysema. Healing nodular tuberculosis, on the other hand, regresses; the nodules become smaller, sharper and often calcified. The ultimate degree of nodular fibrosis reached in silicosis is determined by the amount of retained siliceous material. When this limit is reached there is a substantial degree of arrest if tuberculosis does not complicate the picture. Certain investigators have long recognized a form of tuberculous complication which is like haematogenous tuberculosis in that there is a marked tendency to arrest of the disease, which is particularly striking in cases of the fibrous and acinonodular forms. The condition is designated by them "tuberculosilicosis" to distinguish it from the older, better understood "silicotuberculosis." The chief diagnostic obstacles in building the picture of tuberculosilicosis have been the postmortem absence of evidence of tuberculous infection, the scarcity of clinical symptoms of tuberculosis during life, and, most important, the absence of tubercle bacilli in the sputum. Also the course of the disease is chronic without the patient or the physician realizing the true cause of the mild symptom complex in the early stages. At first the tuberculous fibrosis is so well organized and masked by the compensatory emphysema that its presence is not suspected, but there develops a concentration of fibrosis in patchy areas, usually in the upper lobes. This ends in an asymmetrical distribution which is the telltale point of differentiation between simple silicosis and tuberculosis. Simple silicosis may lead eventually to chronic bronchitis and emphysema with right heart failure. Since clinical haematogenous tuberculosis, too, may progress to a similar ending it is not surprising that when the two conditions cross an augmented tendency to interstitial fibrosis ensues. If silicosis predominates, a more rapidly developing bronchitis and emphysema results; if tuberculosis predominates, the symptom complex of tertiary bronchopulmonary tuberculosis with intracanalicular extension results. Since tuberculosis is predominant and not sufficiently altered by the silicosis to be masked or difficult to diagnose, the condition is called silico-tuberculosis. Asymmetrical distributions of linear and nodular fibrosis in persons with silicosis would therefore seem sufficient to establish the diagnosis of infective silicosis, with tuberculosis, in the majority of cases, labeled the aetiological infection. The term tuberculosilicosis is better reserved for this condition to distinguish it from silicotuberculosis, which might be used to designate the type in which tuberculosis is so predominant as to be diagnosed easily. The morbidity and mortality rates for silicosis might be materially improved if proper changes were made in the occupation of the silicotic person at this stage of his tuberculous infection. This would result in fewer cases of tuberculosilicosis becoming silicotuberculosis—the terminal form of the disease.—*Hematogenous Tuberculosis and*

Silicosis: The Roentgen Diagnosis of Tuberculosilicosis, J. Gershon-Cohen & L. Cohen, J. A. M. A., February 18, 1939, cxii, 602.—(G. L. L.)

Tuberculosis in Coal Miners.—Among 541 anthracite coal miners coming to autopsy in various institutions in Luzerne County, Pennsylvania, pulmonary tuberculosis was the principal cause of death in 21.3 per cent. In 730 autopsies on male nonminers of the same age, during the same period in the same institutions, tuberculosis was the cause of death in 8.9 per cent. At the White Haven Sanatorium a complete postmortem examination was made of 50 patients with anthracosilicosis associated with pulmonary tuberculosis and of 84 patients with nonanthracosilicotic pulmonary tuberculosis, between May, 1934 and May, 1938. During the same period laryngological examinations were made of 100 tuberculous miners and 265 tuberculous adult male nonminers. Of the 50 patients with anthracosilicosis 20 per cent had intestinal tuberculosis, while of the 84 without silicosis, 51 per cent had intestinal tuberculosis. Thirty-five per cent of the 20 patients with early or moderately advanced anthracosilicosis had intestinal tuberculosis, whereas only 10 per cent of the patients with far advanced anthracosilicosis showed intestinal involvement. Twenty-seven per cent of the 100 tuberculous miners studied had tuberculous laryngitis; 31 per cent of the 265 nonminers had laryngeal tuberculosis. Of the miners who died of tuberculosis, 33 per cent had laryngeal tuberculosis; whereas of the nonminers who died of tuberculosis, 59 per cent had laryngeal involvement. Postmortem search for other extrapulmonary tuberculous foci, aside from the larynx and intestines, showed such involvement in 32 per cent of 50 miners as against 46 per cent of 37 adult male nonminers. The rarity of intestinal tuberculosis in the late stage of anthracosilicosis is probably due to the presence of pulmonary fibrosis and the usual chronicity of pulmonary tuberculosis in these patients. When a cavity forms in the centre of a silicotic mass it enlarges very slowly and frequently contains few tubercle bacilli. Moreover, the spread of bacilli is hindered by the frequent sclerosis and obliteration of the vessels within and bordering the silicotic mass. In the majority of cases of silico-tuberculosis with intestinal involvement there were no symptoms referable to the gastrointestinal tract. Pain, tenderness and diarrhoea, though sometimes present, could not be depended on as diagnostic criteria.—*Incidence of Pulmonary and Extrapulmonary Tuberculosis in Anthracite Coal Miners, A. C. Cohen, Arch. Int. Med., June, 1939, lxiii, 1117.—(H. R. N.)*

Tuberculosis and Pneumonoconiosis.—Dusts have been classified according to absorptive, proliferative or inert reaction. Certain dusts, kaolin for example, are practically inert by themselves but, experimentally, in the presence of tubercle bacilli, a typical silicotic nodule results. The growth of the tubercle bacilli is enhanced in the vicinity of the dust. There is clinical corroboration of this finding. Evidence is accumulating that silicates, such as mica and beryllium silicate, are not entirely innocuous. It is quite possible that silicatosis, by whatever mineral produced, renders the lungs less resistant to the tubercle bacillus. Byssinosis, the result of breathing cotton dust, probably does not exist, although mentioned in all textbooks. The action of a particular dust and its influence on tuberculous infection may be altered by admixture with other dusts. Freshly pulverized quartz is more soluble and more active biologically than quartz powder that has been kept for some time. A large number of unsatisfied valences may be imagined, in freshly broken quartz, which will be satisfied by the most readily available substance. Animals exposed to freshly powdered quartz readily contract silicosis. If the dust is mixed with less than 1 per cent of powdered metallic aluminum, the animals are unaffected. The monocytes and histiocytes of the silica reaction yield a phospholipid which when injected into the peritoneum of rabbits reproduces the silicotic nodule. The incidence of tuberculosis among rock workers in anthracite coal mines is considerably higher than the incidence among bituminous coal miners. Patients with silico-siderosis contract tuberculosis as readily as the ordinary silicotic. There is a difference in susceptibility among workers to pneumonoconiosis. Healed or active tuberculosis predisposes to pneumonoconiosis.—*Tuberculosis in Relation to the Pneumonokoniosis, W. E. Cooke, J. Roy. Inst. Pub. Health & Hyg., May, 1939, ii, 299.—(L. F. B.)*

Tuberculous Empyema.—Tuberculous pleural effusions fall into two groups, those associated with pneumothorax and those that arise spontaneously. Most tuberculous empyemata occur as a complication of pneumothorax therapy and vary in percentage from 50 to 100. Spontaneous tuberculous pleural effusions are much less frequent than those which complicate pneumothorax. In the spontaneous type the pleural infection is caused by direct extension of the disease through the visceral pleura from the lung. The infection is accompanied by a serous exudate with straw-colored fluid which rarely becomes purulent and which is usually absorbed slowly. In cases in which

necrosis accompanies the tuberculous disease of the visceral pleura, a bronchopleural fistula is established with resultant pyopneumothorax. If the pleural opening is large the infection may be mixed pyogenic and tuberculous. The simple effusions with no or a very small bronchopleural fistula disappear fairly rapidly. The cellular elements in the fluid utilize most of the available oxygen, leaving very little for the metabolism of the tubercle bacilli. With little oxygen the growth of tubercle bacilli is poor and it becomes difficult to identify the bacilli by smear or culture. When a bronchopleural fistula exists there is an adequate supply of oxygen and the tubercle bacilli grow luxuriantly. When tubercle bacilli are easily demonstrated in pleural effusions the diagnosis of a bronchopleural fistula should be considered. Spontaneous pleural effusions are more frequently associated with haematogenous spreads and tuberculous caries of the vertebral bodies. Pleural effusions complicating pneumothorax therapy are probably due to direct infection of the visceral pleura from the underlying pulmonary disease, although it is also true that the administration of large volumes of air, high intrapleural pressures, or highly negative pressures may cause an effusion. The appearance of fluid is due mainly to the stimulation of the pleura by some antigenic material. If the underlying pulmonary reaction involves caseation to a slight degree, there may be ulceration into the pleural space and the consequent implantation of tubercle bacilli on the pleural membranes. On the size of the area of caseation which ruptures through the visceral pleura will depend the presence or absence of a bronchopleural fistula. Serous, serofibrinous, haemorrhagic and seropurulent effusions are the usual complications of pneumothorax. The fluid will usually be spontaneously absorbed and it is only necessary to aspirate it when effusions are massive and there is evidence of pulmonary dysfunction. The course of the nonpurulent effusion is usually benign. In pure tuberculous empyema when there is not definite evidence of a bronchopleural fistula and when the count of tubercle bacilli in the fluid is low the best course to follow is to leave the patient alone. The fluid will maintain the collapse for a long period to come and it will be slowly absorbed over a period of years. However, if there is evidence of a bronchopleural fistula, there is continuous danger of aspiration of the pleural contents through the fistula, with the possibility of infecting the contralateral lung. This can be avoided only by a thoracotomy followed by a thoracoplasty. It is dangerous to repeatedly aspirate tuberculous empyemata because of the danger of infection of the thoracic wall. Similarly irrigation of the pleural space with various antiseptics carries with it considerable risk. In the presence of a tuberculous empyema with complicating pyogenic infection there is only one form of therapy which produces satisfactory results and that is immediate surgical drainage soon followed by a thoracoplasty.—*Tuberculous Empyema: Classification, Pathogenesis and Treatment, G. G. Ornstein & D. Ulmar, Quart. Bull. Sea View Hosp., April, 1939, iv, 269.*—(*A. A. E.*)

Key to Abstractors

A. A. E.: Adrian A. Ehler, New Rochelle, New York.
A. B. C.: Adele B. Cohn, Bedford Hills, New York.
A. B. T.: Alice B. Tobler, Bedford Hills, New York.
A. P.: Andrew Peters, Springfield, Massachusetts.
F. B. S.: Florence B. Seibert, Philadelphia, Pennsylvania.
F. G. K.: F. G. Kautz, New York City.
G. F. M.: Gertrude F. Mitchell, Detroit, Michigan.
G. L. L.: George L. Leslie, Howell, Michigan.
H. L. I.: Harold L. Israel, Philadelphia, Pennsylvania.
H. R. N.: H. R. Nayer, New York City.
J. D. A.: Joseph D. Aronson, Philadelphia, Pennsylvania.
L. F. B.: Lauren F. Busby, Northville, Michigan.
M. B.: Miriam Brailey, Baltimore, Maryland.
M. T. W.: Mildred T. Woolley, Charleston, West Virginia.
S. L.: Salvatore Lojacono, Howell, Michigan.